Vol. 1119 Number 5

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

October 30, 1990

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

October 30, 1990 Volume 1119 Number 5

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1119 OG 68
Notice of Maintenance Fees Payable	1119 OG 68
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1119 OG 69
Notification of Acceptance of Delayed Payment of Maintenance Fee	1119 OG 71
Reissue Applications Filed	1119 OG 71
Requests for Reexaminations Filed	1119 OG 72
Errata	1119 OG 72
Status of PTO Services	1119 OG 73
Patent Certificates of Correction	1119 OG 75
Special Boxes for Mail	1119 OG 76
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1119 OG 77
Condition of Patent Applications	1119 OG 79
Reexaminations	2139
Reissue Patents Granted (33,406)	2141
Plant Patents Granted (7,368)	2145
Patents Granted	
General and Mechanical (4,965,886)	2147
Chemical (4,966,606)	2397
Electrical (4,967,035)	2517
Design Patents Granted (311,625)	2655
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design and Plant Patentees	PI 62
Classification of	
Patents (Including Reissues, and Reexaminations)	PI 69
Designs, and Plants Applications	PI 72
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 73
Designs and Plant Applications	PI 74
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Nov. 1, 1990, and was announced in the *Official Gazette* at 1119 O.G. 54 on Oct. 23, 1990.

International fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1344.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Sept. 24, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 27, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,701,692 through 4,703,520
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 25, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,411,023 through 4,412,356
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED AUGUST 19, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,344,203	06/230,878	8/17/82
4,344,207	06/243,378	8/17/82
4,344,212	06/225,272	8/17/82
4,344,236	06/217,479	8/17/82
4,344,241	06/256,817	8/17/82
4,344,253	06/241,767	8/17/82
4,344,275	06/223,323	8/17/82
4,344,290	06/295,939	8/17/82
4,344,379	06/230,770	8/17/82
4,344,382	06/254,521	8/17/82
4,344,454	06/268,824	8/17/82
4,344,484	06/217,992	8/17/82
4,344,540	06/222,302	8/17/82
4,344,606	06/220,263	8/17/82
4,344,633	06/266,447	8/17/82
4,344,681	06/238,029	8/17/82
4,344,766	06/255,933	8/17/82
4,344,768	06/248,531	8/17/82
4,344,773	06/217,816	8/17/82
4,344,774	06/246,401	8/17/82
4,344,776	06/264,610	8/17/82
4,344,780	06/230,105	8/17/82
4,344,781	06/231,135	8/17/82
4,344,782	06/230,106	8/17/82
4,344,783	06/255,462	8/17/82
4,344,784	06/238,769	8/17/82
4,344,838	06/255,912	8/17/82
4,344,840	06/232,787	8/17/82
4,344,865	06/231,820	8/17/82
4,344,866	06/288,553	8/17/82
4,344,869	06/237,635	8/17/82
4,344,870	06/237,636	8/17/82
4,344,877	06/224,859	8/17/82
4,344,898	06/329,588	8/17/82
4,344,903	06/227,615	8/17/82
4,344,925	06/225,232	8/17/82
4,344,927	06/217,238	8/17/82
4,344,935	06/265,084	8/17/82
4,344,944	06/220,723	8/17/82
4,344,945	06/241,727	8/17/82
4,344,961	06/232,557	8/17/82
4,344,964	06/241,519	8/17/82
4,344,992	06/278,963	8/17/82
4,345,000	06/216,740	8/17/82
4,345,016	06/279,382	8/17/82
4,345,024	06/259,278	8/17/82
4,345,026	06/224,100	8/17/82
4,345,027	06/215,767	8/17/82
4,345,036	06/225,818	8/17/82
4,345,037	06/238,515	8/17/82
4,345,074	06/244,034	8/17/82
4,345,200	06/242,782	8/17/82
4,345,202	06/218,163	8/17/82
4,345,236	06/220,344	8/17/82
4,345,289	06/260,512	8/17/82
4,345,292	06/270,463	8/17/82
4,606,078	06/714,943	8/19/86
4,606,088	06/662,418	8/19/86
4,606,092	06/693,642	8/19/86
4,606,099	06/590,700	8/19/86
4,606,110	06/753,980	8/19/86
4,606,111	06/555,574	8/19/86
4,606,120	06/673,303	8/19/86
4,606,124	06/724,869	8/19/86
4,606,126	06/708,550	8/19/86
4,606,131	06/523,336	8/19/86
4,606,139	06/723,831	8/19/86
4,606,144	06/697,869	8/19/86
4,606,162	06/642,766	8/19/86
4,606,167	06/666,857	8/19/86
4,606,181	06/466,562	8/19/86
4,606,182	06/646,746	8/19/86
4,606,187	06/694,779	8/19/86
4,606,188	06/640,755	8/19/86
4,606,195	06/711,626	8/19/86
4,606,208	06/610,707	8/19/86
4,606,210	06/677,510	8/19/86
4,606,218	06/691,849	8/19/86
4,606,220	06/709,603	8/19/86
4,606,223	06/619,033	8/19/86
4,606,228	06/689,414	8/19/86
4,606,231	06/708,730	8/19/86
4,606,244	06/511,745	8/19/86
4,606,246	06/688,319	8/19/86
4,606,261	06/675,364	8/19/86
4,606,265	06/665,070	8/19/86

Patent Number	Serial Number	Issue Date
4,606,266	06/726,610	8/19/86
4,606,275	06/803,609	8/19/86
4,606,279	06/511,547	8/19/86
4,606,281	06/615,033	8/19/86
4,606,282	06/806,296	8/19/86
4,606,286	06/498,463	8/19/86
4,606,288	06/785,194	8/19/86
4,606,294	06/588,459	8/19/86
4,606,295	06/579,500	8/19/86
4,606,298	06/692,221	8/19/86
4,606,309	06/696,764	8/19/86
4,606,320	06/818,749	8/19/86
4,606,321	06/697,228	8/19/86
4,606,326	06/717,158	8/19/86
4,606,327	06/680,981	8/19/86
4,606,329	06/736,766	8/19/86
4,606,346	06/688,483	8/19/86
4,606,358	06/576,702	8/19/86
4,606,361	06/630,883	8/19/86
4,606,376	06/730,005	8/19/86
4,606,378	06/746,929	8/19/86
4,606,384	06/705,908	8/19/86
4,606,386	06/545,665	8/19/86
4,606,387	06/700,394	8/19/86
4,606,399	06/755,816	8/19/86
4,606,410	06/677,396	8/19/86
4,606,415	06/672,983	8/19/86
4,606,419	06/664,675	8/19/86
4,606,420	06/730,740	8/19/86
4,606,422	06/708,775	8/19/86
4,606,432	06/619,352	8/19/86
4,606,435	06/649,134	8/19/86
4,606,440	06/681,137	8/19/86
4,606,444	06/519,967	8/19/86
4,606,450	06/709,924	8/19/86
4,606,454	06/659,634	8/19/86
4,606,457	06/739,281	8/19/86
4,606,461	06/724,525	8/19/86
4,606,463	06/495,796	8/19/86
4,606,470	06/670,353	8/19/86
4,606,476	06/745,599	8/19/86
4,606,482	06/791,835	8/19/86
4,606,483	06/716,557	8/19/86
4,606,485	06/746,423	8/19/86
4,606,489	06/514,151	8/19/86
4,606,491	06/686,898	8/19/86
4,606,499	06/626,884	8/19/86
4,606,501	06/648,392	8/19/86
4,606,503	06/561,153	8/19/86
4,606,516	06/608,719	8/19/86
4,606,520	06/598,862	8/19/86
4,606,522	06/644,170	8/19/86
4,606,523	06/444,996	8/19/86
4,606,527	06/684,455	8/19/86
4,606,528	06/727,148	8/19/86
4,606,534	06/785,550	8/19/86
4,606,536	06/722,852	8/19/86
4,606,538	06/719,693	8/19/86
4,606,539	06/558,482	8/19/86
4,606,542	06/666,489	8/19/86
4,606,553	06/741,571	8/19/86
4,606,555	06/664,839	8/19/86
4,606,562	06/674,416	8/19/86
4,606,568	06/679,743	8/19/86
4,606,572	06/752,977	8/19/86
4,606,573	06/672,806	8/19/86
4,606,574	06/518,474	8/19/86
4,606,579	06/546,975	8/19/86
4,606,587	06/690,462	8/19/86
4,606,588	06/720,810	8/19/86
4,606,593	06/740,857	8/19/86
4,606,598	06/729,836	8/19/86
4,606,600	06/686,819	8/19/86
4,606,614	06/438,670	8/19/86
4,606,617	06/656,445	8/19/86
4,606,621	06/650,294	8/19/86
4,606,628	06/678,151	8/19/86
4,606,629	06/560,978	8/19/86
4,606,636	06/545,100	8/19/86
4,606,640	06/595,782	8/19/86
4,606,641	06/645,924	8/19/86
4,606,651	06/436,794	8/19/86
4,606,658	06/798,752	8/19/86
4,606,663	06/669,561	8/19/86
4,606,666	06/592,463	8/19/86
4,606,667	06/720,776	8/19/86
4,606,669	06/668,121	8/19/86
4,606,672	06/666,925	8/19/86
4,606,674	06/602,795	8/19/86
4,606,676	06/525,474	8/19/86
4,606,680	06/532,275	8/19/86
4,606,682	06/651,180	8/19/86
4,606,691	06/490,975	8/19/86
4,606,693	06/636,441	8/19/86
4,606,695	06/611,685	8/19/86
4,606,710	06/785,665	8/19/86
4,606,717	06/760,534	8/19/86
4,606,730	06/534,483	8/19/86
4,606,733	06/698,034	8/19/86
4,606,743	06/749,708	8/19/86
4,606,746	06/779,190	8/19/86
4,606,756	06/666,074	8/19/86
4,606,759	06/237,193	8/19/86
4,606,778	06/665,293	8/19/86
4,606,793	06/704,630	8/19/86
4,606,794	06/692,121	8/19/86
4,606,795	06/768,969	8/19/86
4,606,798	06/725,521	8/19/86
4,606,807	06/738,166	8/19/86
4,606,830	06/642,847	8/19/86
4,606,840	06/650,365	8/19/86
4,606,849	06/695,891	8/19/86
4,606,855	06/516,483	8/19/86
4,606,856	06/712,951	8/19/86
4,606,858	06/699,520	8/19/86
4,606,896	06/697,940	8/19/86
4,606,903	06/603,029	8/19/86
4,606,937	06/705,388	8/19/86
4,606,945	06/781,648	8/19/86
4,606,950	06/645,868	8/19/86
4,606,963	06/705,860	8/19/86
4,606,969	06/775,456	8/19/86
4,606,987	06/573,187	8/19/86
4,607,003	06/721,519	8/19/86
4,607,008	06/586,477	8/19/86
4,607,011	06/721,504	8/19/86
4,607,021	06/336,546	8/19/86
4,607,023	06/644,672	8/19/86
4,607,027	06/658,629	8/19/86
4,607,030	06/751,995	8/19/86
4,607,031	06/737,037	8/19/86
4,607,037	06/681,737	8/19/86
4,607,041	06/601,389	8/19/86
4,607,050	06/430,884	8/19/86
4,607,055	06/751,696	8/19/86
4,606,056	06/751,703	8/19/86
4,607,097	06/616,722	8/19/86
4,607,106	06/735,036	8/19/86
4,607,107	06/569,433	8/19/86
4,607,115	06/799,067	8/19/86
4,607,120	06/635,228	8/19/86
4,607,132	06/765,069	8/19/86
4,607,143	06/559,514	8/19/86
4,607,144	06/572,514	8/19/86
4,607,158	06/565,339	8/19/86
4,607,161	06/540,926	8/19/86
4,607,169	06/688,523	8/19/86
4,607,189	06/582,602	8/19/86
4,607,192	06/554,232	8/19/86
4,607,195	06/565,955	8/19/86
4,607,198	06/684,618	8/19/86
4,607,199	06/648,146	8/19/86
4,607,209	06/609,030	8/19/86
4,607,212	06/529,619	8/19/86
4,607,214	06/487,062	8/19/86
4,607,228	06/570,300	8/19/86

Patent No.	Serial No.	Issue Date
4,607,234	06/700,232	8/19/86
4,607,253	06/677,369	8/19/86
4,607,254	06/262,762	8/19/86
4,607,263	06/667,212	8/19/86
4,606,267	06/681,199	8/19/86
4,607,275	06/586,589	8/19/86
4,607,278	06/536,291	8/19/86
4,607,281	06/651,626	8/19/86
4,607,303	06/565,229	8/19/86
4,607,313	06/514,316	8/19/86
4,607,319	06/767,728	8/19/86
4,607,322	06/651,623	8/19/86
4,607,327	06/536,879	8/19/86
4,607,330	06/555,942	8/19/86
4,607,331	06/494,157	8/19/86
4,607,338	06/793,455	8/19/86
4,607,350	06/446,253	8/19/86
4,607,355	06/546,499	8/19/86
4,607,366	06/549,577	8/19/86
4,607,379	06/668,055	8/19/86
4,607,391	06/431,680	8/19/86
4,607,394	06/708,002	8/19/86
4,607,395	06/577,588	8/19/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1), and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptence Date
Re.32,890	06/059,852	3/21/89	6/08/87	9/24/90
(4,571,907)	(06/641,189)	(2/25/86)	(8/15/86)	
4,526,308	06/569,300	7/02/85	1/09/84	9/10/90
4,563,845	06/616,253	1/14/86	5/30/84	9/27/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,551,104, Re. S. N. 07/574,549, Filed Aug. 27, 1990, Cl. 440, TILT LOCK MECHANISM FOR MARINE PROPULSION DEVICE, Takashi Iwashita, et al., Owner of Record: *Sanshin Kogyo Kabushiki Kaisha, Shizuoka Ken, Japan,* Attorney or Agent: Ernest A. Beutler, Ex. Gp.: 315

4,636,617, Re. S. N. 07/581,420, Filed Sept. 12, 1990, Cl. 219, HEATING COIL ASSEMBLY, Walter J. Peterson, et al., Owner of Record: *Wagner Spray Tech Corp., Minneapolis, Minn.,* Attorney or Agent: Steven H. Nell, Ex. Gp.: 216

4,716,803, Re. S. N. 07/579,980, Filed Sept. 6, 1990, Cl. 83/529, SELF-EQUALIZING PIERCING MACHINE, Edward J. Waltonen, Owner of Record: *Reo Hydraulic Pierce & Form, Inc., Detroit, Mich.,* Attorney or Agent: Donald L. Wood, Ex. Gp.: 324

4,732,272, Re. S. N. 07/497,305, Filed March 22, 1990, Cl. 206/391, PACKAGING FILM PRODUCT, Veijo Heikkinen, Owner of Record: *Amerplast Oy, Tampere, Finland,* Attorney or Agent: George Vande Sande, Ex. Gp.: 241

4,742,450, Re. S. N. 07/521,796, Filed May 3, 1990, Cl. 364/200, METHOD TO SHARE COPY ON WRITE SEGMENT FOR MAPPED FILES, Keith E. Duvall et al., Owner of Record: *International Business Machines, Corp., Armonk, N.Y.,* Attorney or Agent: Kenneth C. Hill, Ex. Gp.: 232

4,772,272, Re. S. N. 07/585,887, Filed Sept. 20, 1990, Cl. 604/198, NEEDLE PROTECTIVE SLEEVE, Barton C. McFarland, Owner of Record: *Inventor,* Attorney or Agent: Dale Lischer, Ex. Gp.: 336

4,784,581, Re. S. N. 07/584,042, Filed Sept. 18, 1990, Cl. 417/312, COMPRESSOR HEAD AND SECTION MUFFLER FOR HEMETIC COMPRESSOR, Jack F. Fritchman, Owner of Record: *White Consolidated Industries, Inc., Cleveland, Ohio,* Attorney or Agent: David A. Tamburro, Ex. Gp.: 343

4,795,613. Re. S. N. 07/586,753, Filed Sept. 20, 1990, Cl. 422/64, BIOCHEMICAL ANALYZOR, Masashi Azuma, et al., Owner of Record: *Konica Corp., Tokyo, Japan,* Attorney or Agent: Bruce G. Chapman, Ex. Gp.: 181

4,813,475, Re. S. N. 07/585,688, Filed Sept. 20, 1990, Cl. 165/21, TEMPERATURE CONTROL MEANS FOR A SELF SERVICE BANKING SYSTEM, Edward F. Couvretto, Owner of Record: *Inventor,* Attorney or Agent: Frank D. Gilliam, Ex. Gp.: 347

4,829,085, Re. S. N. 07/540,817, Filed June 11, 1990, Cl. 514/522, OXIME ETHERS AND FUNGICIDES CONTAINING THESE COMPOUNDS, Bernd Wenderoth, et al., Owner of Record: *BASF Aktiengesel/Schart, Ludwigskafen, Fed. Republic of Germany,* Attorney or Agent: Norman F. Oblon, Ex. Gp.: 125

4,840,828, Re. S. N. 07/419,756, Filed Oct. 11. 1989, Cl. 428/224, STRUCTURAL ELEMENT FORMED OF A RESIN-HARDENED VELOUR FABRIC AND FABRICATION METHOD, Wolfgang Bottger, et al., Owner of Record: *Vorwek & Co. Interholding GmbH, Wuppertal, Germany,* Attorney or Agent: Richard H. Tushin, Ex. Gp.: 154

4,852,088, Re. S. N. 07/586,910, Filed Sept. 24, 1990, Cl. 370/94, PACKET-AT-A-TIME REPORTING IN A DATA LINK CONTROLLER, Dale E. Gulick, et al., Owner of Record: *Advanced Micro Devices, Inc., Sunnyvale, Calif.,* Attorney or Agent: Donald D. Mondul, Ex. Gp.: 263

4,871,393, Re. S. N. 07/587,232, Filed Spet. 24, 1990, Cl. 75/5, APPARATUS AND METHOD FOR FEEDING SINTERING RAW MIX, Masami Fujimoto, et al., Owner of Record: *Nippon Steel Corp., Tokyo, Japan,* Attorney or Agent: V. M. Creedon, Ex. Gp.: 111

4,871,623, Re. S. N. 07/542,706, Filed May 29, 1990, Cl. 428/586, SHEET MEMBER CONTAINING A PLURALITY OF ENLONGATED ENCLOSED ELECTRODEPOSITED CHANNELS AND METHODS, Timothy L. Hoopman, et al., Owner of Record: *Minnesota Mining and Manufacturing, St. Paul, Minn.,* Attorney or Agent: Leland D. Schultz, Ex. Gp.: 111

4,771,663, Re. S. N. 07/583,723, Filed Sept. 17, 1990, Cl. 83/049, MULTISTROKE PUNCHING METHOD AND APPARA-

TUS THEREFOR, Kinshiro Naito, et al., Owner of Record: *Amada Co., Ltd., Isehara-Shi, Japan*, Attorney or Agent: Arthur P. Gersham, Ex. Gp.: 324

4,879,260, Re. S. N. 07/583,663, Filed Sept. 17, 1990, Cl. 501/032, ALUMINA-ZIRCONIA CERAMIC, William R. Manning, Owner of Record: *Cooper Industries, Inc., Houston, Tex.*, Attorney or Agent: John C. Purdue, Ex. Gp.: 118

4,894,062, Re. S. N. 07/586,572, Filed Spt. 19, 1990, Cl. 623/6, STAKING ANCHOR FOR SOFT IOL, F. Richard Christ, et al., Owner of Record: *Allergan, Inc., Irvine, Calif.*, Attorney or Agent: Gordon L. Peterson, Ex. Gp.: 332

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

D. 304,784, Reexam. No. 90/002,140, Requested Sept. 20, 1990, Cl. D3/076, CARRYING CASE, F. Carlos De Witt, Owner of Record: *Acosta-Romana, Los Angeles, Calif.*, Attorney or Agent: Bruce Brunda, Stetina & Brunda, Laguna Hills, Calif., Ex. Gp.: 292, Requester: R.A. Dowell, Arlington, Va.

4,383,668, Reexam. No. 90/002,142, Requested Sept. 20, 1990, Cl. 248/063, CABLE CLAMP, Gaddis G. Hall, Owner of Record: *Inventor, Birmingham, Ala.*, Attorney or Agent: Woodford R. Thompson, Jr., Birmingham, Ala., Ex. Gp.: 355, Requester: Square D Co., Palatine, Ill.

4,391,590, Reexam. No. 90/002,144, Requested Sept. 21, 1990, Cl. 433/090, CARTRIDGE FOR VISCOUS MATERIAL, Emery W. Dougherty, Owner of Record: *Denttsply Research and Development Co., Milford, De.*, Attorney or Agent: C. Hercus Just, York, Pa., Ex. Gp.: 333, Requester: Arthur T. Fattibene, Southport, Conn.

4,522,502, Reexam. No. 90/002,143, Requested Sept. 20, 1990, Cl. 366/160 MIXING AND FEEDING APPARATUS, Carl L. Brazelton, Owner of Record: *Stranco, Inc., Bradley, Ill.*, Attorney or Agent: Harold Stotland, Dithmar, Stotland, Stratman & Levy, Chicago, Ill. Ex. Gp.: 242, Requester: Robert O. Hoffland, Atlantes Chemical Corp., Conroe, Tex.

4,762,564, Reexam. No. 90/002,146, Requested Sept. 25, 1990, Cl. 106/204, REINFORCED CELLULOSE AMINOMETHANATE, Douglas J. Bridgeford, Owner of Record: *Tee Pak, Inc., Oak Brook, Ill.*, Attorney or Agent: Michael J. Dunn, Newfane, N.Y., Ex. Gp.: 115, Requester: Neste Oy, Porvoo, Finland

4,836,868, Reexam. No. 90/002,141, Requested Sept. 18, 1990, Cl. 148/302, PERMANENT MAGNET AND METHOD OF PRODUCING THE SAME, Kohichi Yajima, et al., Owner of Record: *TDK Corp., Tokyo, Japan*, Attorney or Agent: Burgess, Ryan & White, New York, N.Y., Ex. Gp.: 111, Requester: Milton J. Wayne, Burgess, Ryan & White, New York, N.Y.

4,863,438, Reexam. No. 90/002,145, Requested Sept. 21, 1990, Cl. 604/247, LAW PROFILE GASTROSTOMY DEVICE, Michael L. Gauderer, et al., Owner of Record: *Applied Medical Technology, Inc., Independence, Ohio*, Attorney or Agent: Donald L. Otto, Renner, Otto, Boisselle & Sklar, Cleveland, Ohio, Ex. Gp.: 336, Requester: Owner

Errata

"All reference to Patent No. 4,922,729 to Louis P. Saia III of Houma, La. for `PORTABLE SELF-CONTAINED COOLER/FREEZER APPARATUS FOR USE ON COMMON CARRIER TYPE UNREFRIGERATED TRUCK LINES AND THE LIKE' appearing in the Official Gazette of May 8, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,952,148 to Yoshinori Kuboki of Japan for `FINE FILLING METHOD AND FINE FILLER FOR DENTAL' appearing in the Official Gazette of Aug. 28, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,952,681 to Guenter Hansen et al. of Germany for `DYES CONTAINING 3, 4-DISUBSTITUTED-2-DIAZA-THIOPHENE RADICALS' appearing in the Official Gazette of Aug. 28, 1990 should be deleted since no patent was granted."

In the list of patents which expired on Jan. 10, 1988, due to failure to pay maintenance fees, appearing in the O.G. of Feb. 13, 1988, the following patent should not have appeared:

Patent Number	Serial Number	Issue Date	Filing Date
4,419,011	06/285,109	12/06/83	11/21/80

Status of PTO Services

The following is an update of the status of PTO services for Sept. 1990:

Service Item	FY 1990 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	15
Trademarks	30	67
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	2
Mail Coupons	12	4
Letter Orders	16	12
Electronic Ordering Service (EOS)	11	2
Certified Copies:		
Trademark Registrations	21	21
Applications-As-Filed	17	7
File-Wrapper/Contents	N/A	11
Walk-up Certification	1	1
Patent Application Expedited	5	3
Trademark Search Library:		
Filing Pending Marks	23	51
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	9
Assignments:		
Recording Patent-New Applications	20**	18
Recording Patent-Mail Room Recpts.	20	19
Return Patents-New Applications	34**	35
Return Patents-Mail Room Recpts.	34	36
Recording Trademarks	20	20
Returning Trademark Documents	34	35
Avg. Days from Issue Fee Payment to Issue Date	90-100	90
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	84% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

SPECIAL REQUEST

•*Request for Assistance in Completing Trademark Assignment Records*• The Patent and Trademark Office is requesting assistance in completing its assignment records. There are several trademark assignment microfilm reels which are missing from our collection. Letters requesting paper copies have been generated and fowarded to the correspondence addresses listed on the assignment index cards. However, many of the letters are being returned by the U.S. Postal Service because these addresses have been changed over time. If you have a document recorded on one of the trademark assignment reels listed below, please foward a good reproducible copy to the following address:

U.S. Patent and Trademark Office
Box 4970
Washington, D.C. 20231

Attention: Shirley M. Royall
Assignment Search Room

Missing Trademark Assignment Reels:

110	124	191	293B
111	125	197	594A
112	167	212	
113	179	235	
123	190	236	

The Patent and Trademark Office is making duplicate copies of all assignment reels to ensure back-up microfilm is accessible in the future. One copy of each reel is also being forwarded to the National Underground Storage area in Boyers, Pennsylvania, for maintenance under the Vital Records Program.

HELPFUL HINTS

•*Certification Process Review*• The Office has begun a complete review of certification processing with the goal of streamlining operations to better meet customer needs. All of the supervisors and managers in the certification area, as well as employees, are involved.

As part of the review, several meetings with certification customers hanve been held to ensure that customer views are heard and to share the findings and recommendations derived during the certification process review. Customer meetings will continue to be held the third Wednesday of each month. Anyone interested in attending these meetings should contact the Assignment/Certification Services Division on (703) 557-7770.

Following is a series of helpful hints that have been developed to date as a result of the certification process review meetings.

•*Use Complete Application Number*• When ordering certified copies of patent and trademark applications, please identify the document by its complete application number. The application number includes the two digit series code (Examples: patents-06, 07; trademarks-73, 74) and six-digit serial number.

•*Authorization to Order Certified Copies of Applications as Filed*• When requesting a certified copy of a patent application as filed, if either the attorney of record has changed since filing or a power to inspect has been filed, please provide a copy of the new power of attorney or the power to inspect. The Certification Branch prepares the bulk of certified copies of applications as filed from the microfiche that contains information pertaining to the attorney of record at the time of filing. When a change in attorney of record is made, or when a power to inspect has been filed, this information is not readily available to the Certification Branch unless it is provided with the request.

•*Ordering Different Products from Certification Branch*• When ordering copies from the Certification Branch, whenever possible request only one type of service per order to speed processing. Example: a request for a copy of a patent application as filed should be seperate from a request for a patent file wrapper and contents.

•*Expedited Orders for Certified Copies of Applications as Filed*• When submitting requests for expedited certified copies of patent applications as filed, please include no more than three different application numbers on one request. The Certification Branch fills all copies from one request as a complete order. The Office's experience has been that orders which have no more than three application numbers can be filled and delivered most quickly within our five-day service goal; orders with a large number of individual application numbers often result in one or more applications requiring special research or handling which can slow the process. For example, better service can usually be given on five individual orders with three applications numbers on each one rather than one order with 15 application numbers on it.

In addition, some customers are using terms such as "rush" or "special" on every order they place; other customers use those terms to identify requests they want to be filled within five days. Please refrain from using the words such as "rush" or "special" and only use the term "expedite" when you have requested and paid for five-day expedited service.

•*Refunds*• The U.S. Patent and Trademark Offie is prohibited from providing refunds to customers except in situations where the Office failed to properly fulfill the request. The Certification Branch, therefore, cannot provide refunds for customers who no longer need a service or for "a mere change of purpose after the payment of money." See 37 CFR 1.26.

October 5, 1990

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of October 30, 1990

B14,574,859	4,859,851	4,872,494	4,880,296
Re. 32,926	4,860,254	4,872,509	4,880,376
4,460,806	4,860,945	4,872,788	4,880,388
4,577,509	4,861,629	4,872,792	4,880,872
4,696,930	4,861,759	4,872,860	4,881,311
4,715,895	4,862,011	4,872,900	4,881,793
4,748,223	4,863,063	4,872,984	4,881,825
4,761,214	4,863,532	4,873,134	4,881,881
4,762,384	4,863,634	4,873,361	4,881,912
4,768,261	4,865,715	4,873,386	4,881,947
4,770,233	4,865,775	4,873,980	4,881,990
4,792,819	4,865,931	4,874,141	4,882,408
4,795,248	4,865,999	4,874,338	4,883,545
4,802,079	4,866,153	4,874,339	4,883,555
4,807,485	4,866,660	4,874,627	4,883,608
4,809,664	4,867,163	4,874,700	4,883,692
4,818,715	4,867,240	4,874,828	4,883,975
4,821,079	4,867,356	4,874,878	4,884,203
4,823,251	4,867,560	4,874,888	4,884,552
4,834,181	4,867,768	4,875,222	4,884,752
4,839,095	4,867,863	4,875,475	4,885,335
4,841,909	4,868,244	4,875,795	4,885,336
4,842,188	4,868,720	4,875,833	4,885,474
4,845,135	4,869,112	4,876,846	4,885,969
4,846,093	4,869,951	4,877,137	4,886,079
4,848,171	4,870,056	4,877,593	4,887,028
4,848,338	4,870,114	4,877,598	4,887,296
4,848,698	4,870,124	4,877,706	4,888,061
4,849,251	4,871,109	4,878,007	4,888,267
4,851,090	4,871,141	4,878,640	4,889,985
4,852,846	4,871,350	4,878,816	4,890,421
4,854,351	4,871,649	4,878,825	4,893,027
4,854,602	4,871,698	4,879,032	4,894,388
4,855,619	4,872,082	4,879,076	4,895,206
4,855,758	4,872,115	4,879,198	4,916,611
4,857,271	4,872,323	4,879,293	4,918,541
4,858,762	4,872,334	4,880,025	4,924,509
4,859,500	4,872,396	4,880,080	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 200	Mail relating to PTO Bicentennial Celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box DAC	Petitions to revive, petitions to accept late payment of fees, petitions to defer issue, and petitions to withdraw an application from issue.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	Not Yet Operational
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 405-9157
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	Not Yet Operational
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372

Reference Collection of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

State	*Name of Library*	*Telephone Contact*
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF August 25, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	12-14-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	4-23-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	8-15-88
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	3-29-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	12-22-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director.	9-18-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	4-25-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	1-21-87
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	10-1-89

Expiration of patents: The patents within the range of numbers indicated below expire during August 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,750,192 to 3,755,818 inclusive
Plant Patents	3,385 to 3,394 inclusive

REEXAMINATIONS

OCTOBER 30, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,070,586 (1375th)

ELECTRIC VACUUM CLEANING AND AGITATOR MOTOR CONTROL SYSTEM

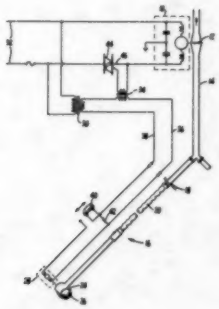
John J. Breslin, Los Altos, Calif., assignor to Beamco, Inc., Mountain View, Calif.

Reexamination Request Nos. 90/001,009, May 14, 1986 and 90/001,218, Apr. 17, 1987.

Reexamination Certificate for Patent No. 4,070,586, issued Jan. 24, 1978, Ser. No. 716,682, Aug. 23, 1976.

Int. Cl.[5] H02J *3/02*

U.S. Cl. 307—22



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **10** is confirmed.

Claims **1–6, 8** and **9** are cancelled.

Claim **7** is determined to be patentable as amended.

New claims **11–19** are added and determined to be patentable.

13. A control system for selectively energizing and supplying power to a central and remote electric load device interconnected by a single conductor pair which conducts a single current circuit only from a common control located at the remote device comprising:

a. power means at the location of the central electrical device for providing electrical power to said central device and electrical current for the single circuit of the conductor pair interconnecting said central device with the remote electrical device;

b. first switching means interposed between said power means and said central device for controlling the flow of electrical current to said central device;

c. second switching means at the location of said remote device and interposed in one conductor of said pair for controlling the flow of electrical current to said remote device;

d. a current sensor at the location of said central device and interposed in one conductor of said pair, said sensor generating a control voltage in response to a flow of current through said conductor pair; and

e. actuating means responsive to said current sensor and coupled to said first switching means for actuating said first switching means in response to the control voltage generated by said sensor.

B2 4,355,032 (1376th)

9-(1,3-DIHYDROXY-2-PROPOXYMETHYL)GUANINE AS ANTIVIRAL AGENT

Julien P. Verbeyden, Los Altos, and John C. Martin, Redwood City, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Reexamination Request No. 90/000,765, Apr. 24, 1985.

Reexamination Certificate for Patent No. 4,355,032, issued Oct. 19, 1982, Ser. No. 267,210, May 21, 1981.

Int. Cl.[5] C07D *473/18;* **A61K** *31/52*

U.S. Cl. 514—262

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–5** is confirmed.

1. The compound 9-(1,3-dihydroxy-2-propoxymethyl)guanine and the pharmaceutically acceptable salts thereof.

B1 4,647,612 (1377th)

POLYMER EMULSION PRODUCTS

Ajay I. Ranka, Allison Park, and Suryya K. Das, Pittsburgh, both of Pa., assignors to PPG Industries Inc., Pittsburgh, Pa.

Reexamination Request No. 90/001,854, Oct. 2, 1989.

Reexamination Certificate for Patent No. 4,647,612, issued Mar. 3, 1987, Ser. No. 814,458, Dec. 30, 1985.

Int. Cl.[5] C08L *33/02, 37/00*

U.S. Cl. 524—458

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–10** are cancelled.

[1. In a process for preparing a polymer in latex form by free radical initiated polymerization of a mixture of polymerizable alpha, beta-ethylenically unsaturated monomers in aqueous medium in the presence of a polymeric surfactant, characterized in that the mixture of polymerizable alpha, beta-ethylenically unsaturated monomers contains from 0.5 to less than 30 percent by weight based on total weight of the mixture of polymerizable alpha, beta-ethylenically unsaturated monomers, of an epoxy group-containing alpha, beta-ethylenically unsaturated monomer, and the polymeric surfactant is a salt of a carboxylic acid group-containing polymer.**]**

B1 4,692,491 (1378th)

POLYMER EMULSION PRODUCTS

Ajay I. Ranka, Allison Park, and Suryya K. Das, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Reexamination Request No. 90/001,855, Oct. 2, 1989.

Reexamination Certificate for Patent No. 4,692,491, issued Sep. 8, 1987, Ser. No. 907,563, Sep. 15, 1986.

Division of Ser. No. 814,458, Dec. 30, 1985, Pat. No. 4,647,612. This application Oct. 2, 1989, Ser. No. 907,563

Int. Cl.[5] C08L *33/02, 37/00*

U.S. Cl. 524—458

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–10** are cancelled.

[1. A polymer in latex form prepared by free radical initiated polymerization of a mixture of polymerizable alpha, beta-ethylenically unsaturated monomers in aqueous medium in the presence of a polymeric surfactant, characterized in that the mixture of polymerizable, alpha, beta-ethylenically unsaturated monomers contains from 0.5 to less than 30 percent by weight based on total weight of the mixture of polymerizable alpha, beta-ethylenically unsaturated monomers, of an epoxy group-containing alpha, beta-ethylenically unsaturated monomer, and the polymeric surfactant is a salt of a carboxylic acid group-containing polymer.]

REISSUES

OCTOBER 30, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

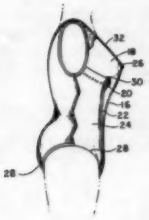
Re. 33,406
SWIMSUIT

Carol W. Wior, Los Angeles, Calif., assignor to The WIOR Corporation, Los Angeles, Calif.

Original No. 4,571,742, dated Feb. 25, 1986, Ser. No. 749,895, Jun. 28, 1985. Application for reissue Feb. 25, 1988, Ser. No. 160,215

Int. Cl.[5] A41D *7/00*

U.S. Cl. 2—67 **18 Claims**



9. A swimsuit comprising:

an outer bathing garment covering a female loin and having a padding-free front breast cover;

an inner liner garment engirdling the female loin, and joined to a border of the outer garment; and

breast supporting means disposed above the inner liner garment in the region of the breast and secured to the inner liner garment, so that the breasts are thrust upwardly and forward toward the outer garment.

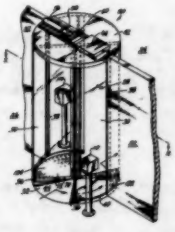
Re. 33,407
REVOLVING DOOR CONTROL SYSTEM

Milan Schwarz, 1770 Canyon View Dr., La Verne, Calif. 91750

Original No. 4,627,193, dated Dec. 9, 1986, Ser. No. 712,557, Mar. 15, 1985. Continuation-in-part of Ser. No. 533,983, Sep. 20, 1983, abandoned. Application for reissue Dec. 9, 1988, Ser. No. 282,108

Int. Cl.[5] E05D *15/02*

U.S. Cl. 49—42 **47 Claims**



46. A control for a security door of the type having a housing with an entrance and an exit, a member rotatably disposed in the housing and having a plurality of wings which, in cooperation with the housing, define at least one compartment movable between the entrance and exit in response to rotation of the member, the control comprising:

means for enabling the member for rotation to move a selected compartment between the entrance and exit in response to identification of an authorized person;

means for generating pulses as the selected compartment moves between the entrance and exit, each pulse representing a small increment of movement of the selected compartment, and being independent of any specific positional relationship of the wings to the housing;

means for determining the position of the selected compartment from the pulses;

means for sensing an unauthorized person or object in at least one position between the entrance and exit, the sensing means generating a signal indicative of such person or object; and

means for comparing the position of the door with the signal to indicate the passage of the authorized individual through the designated region, the comparing means issuing a disabling command to prevent further motion of the compartment toward the exit when the position of the compartment and the signal indicates the presence of an unauthorized person or object.

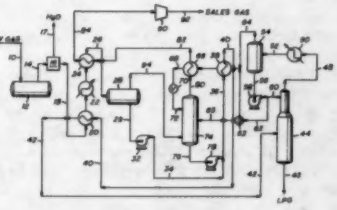
Re. 33,408
PROCESS FOR LPG RECOVERY

Shuaib A. Khan, and James Halliburton, both of Calgary, Canada, assignors to Exxon Production Research Company, Houston, Tex.

Original No. 4,507,133, dated Mar. 26, 1985, Ser. No. 537,127, Sep. 29, 1983. Application for reissue Dec. 16, 1985, Ser. No. 809,666

Int. Cl.[5] F25J *3/02*

U.S. Cl. 62—29 **41 Claims**



1. In a process for separating propane and heavier hydrocarbons from a gaseous feedstream containing hydrocarbon components of different boiling points wherein said feedstream is cooled and separated into a first vapor fraction and a first liquid fraction and said first liquid fraction is distilled in a deethanizer to form a second vapor fraction and a second liquid fraction, the improvement which comprises [expanding and] transferring said first vapor fraction to the lower portion of a direct heat exchanger, cooling *at least a portion of* said second vapor fraction *by passing it through an indirect heat exchanger* to form a substantially liquefied stream, *partially flashing at least a portion of said liquefied stream and transferring* [at least a portion of said liquefied stream] *it* to the upper portion of said direct heat exchanger whereby said liquefied stream contacts said first vapor fraction to form a third vapor fraction and a third liquid fraction, [returning] *transferring* said third liquid fraction to said deethanizer, [and] removing said third vapor fraction from said direct heat exchanger *and passing said third vapor fraction through said indirect heat exchanger.*

Re. 33,409

GRIP ASSEMBLY

John M. Curtis, R.D. 5, Box 375, Kittanning, Pa. 16201

Original No. 4,662,229, dated May 5, 1987, Ser. No. 769,372, Aug. 26, 1985. Application for reissue May 3, 1989, Ser. No. 347,517

Int. Cl.[5] G01N *3/02*

U.S. Cl. 73—859 **22 Claims**

1. Grip apparatus for use with tensile stress testing apparatus adapted to measure tensile stress in a test specimen comprising

a housing having a bottom surface, a top surface, opposing front and rear surfaces and opposing side surfaces,

connecting means secured to the top surface of said housing for connecting said grip apparatus to said tensile stress testing apparatus,

a first bore extending from said bottom surface upwardly through a portion of said housing,

a pair of second bores extending from said top surface of said housing through said housing and converging toward the bottom surface of said housing, with the lower end of each of said second bores opening into said first bore,

a pair of grip bars, one of said grip bars being slidably mounted in one of said second [.] and the other of said grip bars being slidably mounted in the other of said second bores, *said grip bars being enclosed by said second bores and conforming in cross-section to the cross-section of said second bores,* each of said grip bars extending above the said top surface and each of said grip bars having grip insert means secured on the lower end of said grip bar at least partially within said first bore, the said grip insert means being opposed and being adapted to compressively engage opposed surfaces of [a] said test specimen, whereby application of tensile stress to said test specimen increases the compressive engagement of said grip insert means with said test specimen.

Re. 33,410

LIQUID-LIQUID EXTRACTION OF GERMANIUM FROM AQUEOUS SOLUTION USING HYDROXY-OXIMES

Achille De Schepper, Lichtaart, and Antoine Van Peteghem, Olen, both of Belgium, assignors to Acec-Union Miniere S.A., MHO Division, Hoboken, Belgium

Original No. 3,883,634, dated May 13, 1975, Ser. No. 464,387, Apr. 26, 1974. Application for reissue Feb. 26, 1990, Ser. No. 485,902

Claims priority, application Belgium, May 14, 1973, 67596

Int. Cl.[5] C01G *3/00, 17/00*

U.S. Cl. 423—89 **17 Claims**

1. A process for liquid-liquid extraction of germanium from an aqueous solution, in which an organic liquid containing [hydroxy-oxime] *α-hydroxy-oxime* is used as extractant comprising contacting an aqueous solution containing germanium and an acid selected from the group consisting of 10 to 500 grams per liter of hydrochloric acid, 10 to 500 grams per liter of sulfuric acid, and 10 to 100 grams per liter of hydrofluoric acid, with an organic liquid selected from the group consisting of non-diluted [hydroxy-oxime] *α-hydroxy-oxime*, a solution of [hydroxy-oxime] *α-hydroxy-oxime* in an aliphatic solvent, a solution of [hydroxy-oxime] *α-hydroxy-oxime* in an aromatic solvent, and a solution of [hydroxy-oxime] *α-hydroxy-oxime* in a mixture of an aliphatic and an aromatic solvent, separating the organic liquid phase containing extracted germanium from the residual aqueous phase, and recovering the extracted germanium from the separated organic phase by contacting with an agent selected from the group consisting of water, acids, and bases.

Re. 33,411

VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE

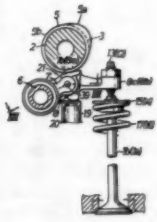
Kazuo Inoue; Kenichi Nagahiro; Yoshio Ajiki, and Masaaki Katoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 4,790,274, dated Dec. 13, 1988, Ser. No. 8,741, Jan. 30, 1987. Application for reissue Jul. 31, 1989, Ser. No. 386,772

Claims priority, application Japan, Jul. 30, 1986, 61-179093; Jul. 30, 1986, 61-179094

Int. Cl.[5] F01L *1/26, 1/34*

U.S. Cl. 123—198 F **12 Claims**



1. A valve operating mechanism for operating a plurality of valves of a particular cylinder of an internal combustion engine, comprising:

a camshaft rotatable in synchronism with rotation of the internal combustion engine and having at least one cam;

a plurality of cam followers, one of which slidably engages with said cam for selectively operating the valves according to a cam profile of said cam; and

means for selectively interconnecting and disconnecting said cam followers to operate the valves differently in different speed ranges of the internal combustion engine, said speed ranges including a range in which all of the valves remain inoperative.

Re. 33,412

HOSE CONSTRUCTION

Donald L. Oglesby, and Robert H. Sinnamon, both of Ocala, Fla., assignors to Dayco Products, Inc., Dayton, Ohio

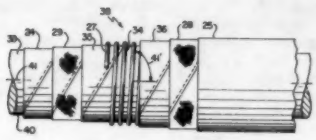
Original No. 4,706,712, dated Nov. 17, 1987, Ser. No. 845,142, Mar. 27, 1986. Application for reissue Dec. 5, 1989, Ser. No. 446,501

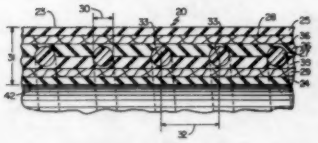
Int. Cl.[5] F16L *11/08*

U.S. Cl. 138—126 **14 Claims**

1. In a hose construction having a tubular wall comprising an inner layer of polymeric material, an outer layer of polymeric material, an intermediate layer of polymeric material disposed between said inner and outer layers, a helically wound thermoplastic monofilament of substantially circular transverse cross-sectional configuration embedded in said intermediate layer, a first ply of woven material disposed intermediate said outer layer and said intermediate layer, and a second ply of woven material disposed intermediate said inner layer and said intermediate layer, the improvement wherein said monofilament

has a diameter that has a length that is approximately one-third of the thickness of said wall and that is approximately one-third of the longitudinal cross-sectional distance between the centers of each pair of adjacent turns of said monofilament when considering a longitudinal cross section of said hose construc-





tion whereby said hose construction will substantially return to its original shape even afer said hose construction has been collapsed [by having a vacuum of approximately 24 inches Hg applied therein or] by having been run over by a pair of tractor trailer wheels of a loaded vehicle of approximately 60,000 pounds net weight.

Re. 33,413

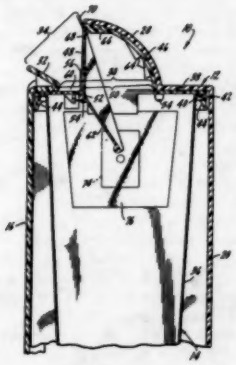
SHARPS DISPOSAL SYSTEM

Paul H. Hanifl, Barrington, Ill., assignor to Sage Products, Inc., Cary, Ill.

Original No. 4,715,498, dated Dec. 29, 1987, Ser. No. 934,413, Nov. 24, 1986. Application for reissue Dec. 4, 1989, Ser. No. 445,367

Int. Cl.[5] B65F *1/16*

U.S. Cl. 206—366 **25 Claims**



22. A disposal system comprising

a. a hollow, outer enclosure,

b. an elongated slot for permitting access to the interior of the outer enclosure,

c. barrier means disposed adjacent said slot for restricting access to the interior of said outer enclosure, at least a portion of said barrier means comprising a constriction extending over said slot, and

d. a removable inner container disposed within said outer enclosure, said inner container including an inlet in registration with said slot, said inlet including means for cooperating with said constriction for restricting access to the interior of said inner container.

Re. 33,414

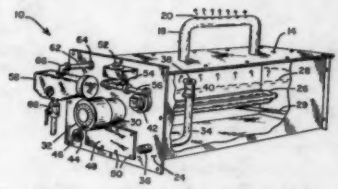
ELECTRIC STEAM HUMIDIFIER

Bernard W. Morton, Minnetonka, Minn., assignor to DRI STEEM Humidifier Company, Hopkins, Minn.

Original No. 4,239,956, dated Dec. 16, 1980, Ser. No. 929,271, Jul. 31, 1978. Application for reissue Jan. 18, 1989, Ser. No. 298,906

Int. Cl.[5] F24F *6/18*

U.S. Cl. 392—386 **4 Claims**



1. A humidifier unit for use with a forced air heating system comprising:

(a) a rectangular container having a face plate on one end thereof and a removable top plate member having vapor outlet means therein;

(b) electrically operated valve means attached to said face plate for controlling the flow of water into said container;

(c) an immersible heater element having a first portion thereof disposed in said container at a predetermined elevation and a second portion extending through and attached to said face plate;

(d) a float operated control device affixed to said face plate and electrically connected to said valve means and to said heater element for opening said valve when the depth of water in said container falls below a first level and for closing said valve when the depth of water in said container reaches a second predetermined level, said control device opening the circuit to said heater element when the depth of the water in said container falls a predetermined distance below said first level;

(e) a drain tube member having an open upper end mounted within said container and having the other end thereof extending outwardly therefrom, said drain tube having an aperture formed through the side wall thereof a predetermined distance below the upper open end thereof, the top of the aperature in said drain tube corresponding to said second predetermined level and the bottom of said aperature corresponding to [said] *a* third predetermined level *between the first and second levels; and*

(f) the vapor outlet means comprising a perforated steam discharge tube having a pair of substantially coextensive, spaced tubular leg sections extending upwardly above the removable top plate member and connected to the top plate member and opening to said container through apertures in the top plate member, and having a second tube section connected to and extending laterally between the two tubular leg sections and projecting into an air stream, said second tube section having outlet openings for discharge of steam therefrom into such air stream remote from the container.

Re. 33,415

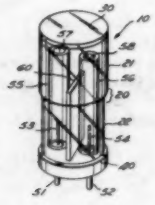
DOUBLE-BORE CAPILLARY-TUBE GAS DISCHARGE LAMP WITH AN ENVELOPE WINDOW TRANSPARENT TO SHORT WAVELENGTH LIGHT

Marinko Jelic, 25382 Westborne Dr., Dana Point, Calif. 92629

Original No. 4,810,924, dated Mar. 7, 1989, Ser. No. 53,721, May 26, 1987. Application for reissue Dec. 28, 1989, Ser. No. 458,160

Int. Cl.[5] H01J *61/10, 61/30*

U.S. Cl. 313—609 **12 Claims**



7. A gas discharge lamp comprising:

an elongate tubular envelope having an integrally formed partition extending axially from one end of said envelope toward the opposite end of said envelope defining a pair of bores within the interior of said envelope disposed on opposite sides of the partition;

an electrode disposed within each of said pair of bores extending axially from one end of said envelope toward the opposite end of said envelope; and

a capillary tube disposed about at least one of said electrodes extending from said one end of said envelope toward said opposite end of said envelope; and

a window disposed at said opposite end of said envelope, said bores being sized to retain said capillary tube in axial alignment within said envelope.

Re. 33,416

PILING PLANNING METHOD AND PILING SYSTEM OF CARGOES BY PALLETIZING ROBOT

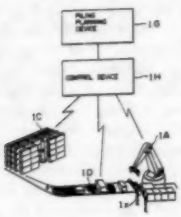
Yozo Konishi, Yokohama; Kichizo Akashi, Ebina; Hideo Watase, Tsuchiura, and Tatsuo Yoshioka, Ichikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,641,271, dated Feb. 3, 1987, Ser. No. 668,962, Nov. 7, 1984. Application for reissue Feb. 3, 1989, Ser. No. 305,700

Claims priority, application Japan, Nov. 9, 1983, 58-209057; Jul. 19, 1984, 59-150058

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—478 **18 Claims**



5. A piling planning method for determining a cargo piling disposition and a cargo piling order to pile cargoes on a base for piling cargoes, comprising:

storing an effective mounting space specification on said base and a cargo specification in a memory;

inputting information for piling cargoes on said base to a computer according to a stored program;

processing piling planning information in said computer;

determining a cargo piling disposition in said effective mounting space on said base corresponding to said inputted information; and

producing documentation graphically showing a condition of said cargo piling disposition and a final cargo piling order outputted from said computer.

Re. 33,417

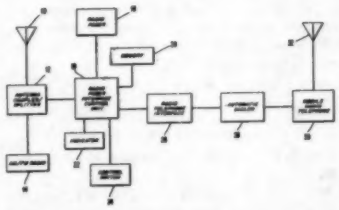
MOBILE PAGING CALL BACK SYSTEM AND RELATED METHOD

Jai P. Bhagat, and William D. Hays, both of Jackson, Miss., assignors to Mobile Telecommunication Technologies Corporation, Jackson, Miss.

Original No. 4,747,122, dated May 24, 1988, Ser. No. 923,206, Oct. 27, 1986. Application for reissue Feb. 6, 1989, Ser. No. 306,548

Int. Cl.[5] H01Q *7/00*

U.S. Cl. 379—57 **2 Claims**



2. A mobile paging and radio telephone call back system comprising:

a mobile radio telephone having means for digitally controlling dialing of said telephone in response to control head signals;

radio pager means for receiving radio broadcast paging signals which include data representing a telephone number and for providing as an output data which represents that telephone number; a mobile power supply coupled to power both said mobile radio telephone and said radio pager means;

a memory;

indicator means for providing a signal to a system operator;

control switch;

manual dialer means, coupled to said mobile radio telephone for generating control head signals for digitally controlling dialing of said mobile radio telephone;

control unit means for interconnecting said radio pager means, said memory, said indicator, said control switch and said dialer means, said control unit means including:

(a) interface means for converting said data representing said telephone number to corresponding control head signals for use by said mobile telephone; and

(b) a logic circuit; (i) to provide verification that valid data representing a telephone number has been received from said radio pager, (ii) to store said data, after said verification in said memory, (iii) to activate said indicator, after said verification, to provide a signal indicating that validated data has been received, and (iv) to either transfer said stored data from said memory to said interface means for use therein to generate said corresponding control head signals to dial said mobile radio telephone, or to erase said data from said memory, in response to activation of said control switch.

PLANT PATENTS

GRANTED OCTOBER 30, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,368
ROSE PLANT INTERLIEN
Peter Ilsink, Leersum, Netherlands, assignor to Jackson & Perkins Company, Medford, Oreg.
Filed Mar. 10, 1989, Ser. No. 321,905
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—26 1 Claim

1. A new and distinct variety of rose plant of the Floribunda class substantially as herein shown and described, characterized particularly as to novelty by its vigorous upright growth habit, glossy green disease resistant foliage, good production of flowers in sprays of three to seven flowers, and long vase life.

7,369
HIBISCUS PLANT NAMED ALOHA PINK
Frank C. Moser, Alva, Fla., assignor to Yoder Brothers, Inc., Barberton, Ohio
Filed Aug. 22, 1989, Ser. No. 396,975
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—54 1 Claim

1. A new and distinct cultivar of Hibiscus plant named Aloha Pink, as described and illustrated.

7,370
HIBISCUS PLANT NAMED HAWAIIAN HOLLY
Frank C. Moser, Alva, Fla., assignor to Yoder Brothers, Inc., Barberton, Ohio
Filed Aug. 21, 1989, Ser. No. 396,960
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—54 1 Claim

1. A new and distinct cultivar of Hibiscus plant named Hawaiian Holly, as described and illustrated.

7,371
IMPATIENS PLANT NAMED PATULA
Ludwig Kientzler, Gensingen, Fed. Rep. of Germany, assignor to Paul Ecke Ranch, Encinitas, Calif.
Filed Aug. 16, 1989, Ser. No. 394,747
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Impatiens plant named Patula, as illustrated and described.

7,372
IMPATIENS PLANT NAMED MARUMBA
Ludwig Kientzler, Gensingen, Fed. Rep. of Germany, assignor to Paul Ecke Ranch, Encinitas, Calif.
Filed Aug. 16, 1989, Ser. No. 394,746
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Impatiens plant named Marumba, as illustrated and described.

7,373
VARIETY OF GERANIUM NAMED CAMILLE
Jacques Guillou; Bernard Guillou, and Maurice Guillou, all of Saint-Malo, France, assignors to Etablissement Guillou Freres Jacques, Bernard et Maurice, France
Filed Jun. 1, 1989, Ser. No. 360,012
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of Ivy Geranium plant as shown and described herein and characterized by a new orchid color, a stronger ability to tolerate high temperatures, a medium green foliage with an upright yet cascading habit accented by the light orchid blossoms.

7,374
GERANIUM NAMED KLEFIZON
Siegfried Klemm, Stuttgart, Fed. Rep. of Germany, assignor to Klemm & Sohn, Stuttgart-Muhlhausen, Fed. Rep. of Germany
Filed May 24, 1989, Ser. No. 356,126
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—68 1 Claim

1. The new and distinctive Geranium plant, substantially as herein shown and described, particularly distinguished by its clear pink salmon coloration and the relatively large size of its flower clusters and the large size and number of florets comprised in each cluster.

PATENTS

GRANTED OCT. 30, 1990

ERRATA

For CLASS	See PATENT NO.
026-081	4,965,918
084-663	4,966,051
084-715	4,966,052
084-718	4,966,053
228-263	4,966,142
272-085	4,966,309
223-119	4,966,316
346-076	4,966,464
403-024	4,966,482
364-200	4,966,605
252-174	4,966,606
106-456	4,966,641
424-010	4,966,752
424-088	4,966,753
424-195	4,966,754
501-152	4,966,875
073-116	4,967,035
074-054	4,967,036
123-598	4,967,037
128-644	4,967,038
392-384	4,967,060
364-200	4,967,326
606-214	4,967,345

PATENTS

GRANTED OCTOBER 30, 1990

GENERAL AND MECHANICAL

4,965,886

PRESSURIZED SPACESUIT FITTED WITH VARIABLE PRESSURE GLOVES FOR IMPROVED DEXTERITY

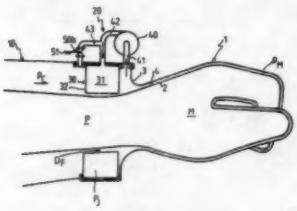
Wubbo Ockels, An Maastricht, Netherlands, assignor to Agence Spatiale Europeenne, Paris, France

Filed Apr. 13, 1989, Ser. No. 337,331

Claims priority, application France, Apr. 27, 1988, 88 05609

Int. Cl.[5] A62B *17/00*

U.S. Cl. 2—2.1 A **4 Claims**



1. A pressurized suit for an astronaut, said suit having at least one elastic glove disposed adjacent a wrist and a hand of the astronaut, said glove communicating under normal conditions with the interior of the remainder of said suit, said suit and said glove normally being filled with air at a first pressure equal to that which should be applied to the body of the astronaut under conditions of physiological equilibrium, a pressure-reducing device for reducing the pressure inside said glove relative to said first pressure inside said suit in order to increase dexterous use of the hand of the astronaut, said pressure-reducing device including an inflatable elastic cuff encircling the wrist of the astronaut and connected to said glove and to the remainder of said suit, said cuff under normal conditions providing functional clearance between the wrist of the astronaut and the thereto adjacent wall of said cuff sufficient to permit intercommunication between said glove and the remainder of said suit, said pressure-reducing device further including micro-pump means for inflating said cuff by withdrawing air from inside said glove and delivering at least part of said withdrawn air into said inflatable cuff and thereby putting said cuff under pressure, and said pressure-reducing device further including a control valve for controlling the pressure within said cuff.

4,965,887

FACE PROTECTOR FOR SPLASH AND SPATTER PROTECTION

John A. Paoluccio, P.O. Box J, 5038 Salida Blvd., Salida, Calif. 95829, and Dennis R. Hoover, Modesto, Calif., assignors to John A. Paoluccio, Salida, Calif., a part interest

Continuation-in-part of Ser. No. 119,696, Nov. 12, 1987, abandoned. This application Sep. 26, 1988, Ser. No. 249,595

Int. Cl.[5] A61F *9/04*

U.S. Cl. 2—9 **6 Claims**

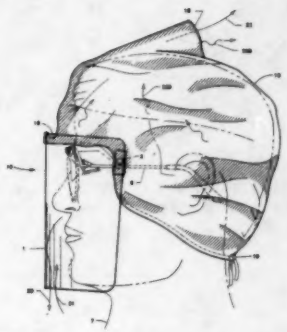
1. A device for protecting the face including the eyes, nose, ears and mouth, which comprises:

a clear plastic member disposed generally in the form of a cylindrical section;

two spring loaded, rubber lined clips fixed on said member at spaced points and securing said member proximate to the edges thereof to associated temple frames of associated eyeglass frames, said member being covered with protective release liner on both sides to keep it protected from scratching and dirt until ready for use;

said member having attached to the top and sides thereof a multiple layered head cover;

said head cover having a fluid absorbent outside layer for absorbing fluid spatter; a fluid and bacteria impermeable lightweight, flexible plastic liner to prohibit any passage of fluid or bacteria through said head cover; and a fluid absorbing inside layer that touches the wearer's skin; said



head cover having excess absorbing material at the user's forehead area to form a fluid trap to hold excess fluid splash while the outer layer, absorbs the fluid splash, thereby preventing fluid from running down said member.

4,965,888

SURROGATE NURSING BIB

Stacye C. Jones, 456 S. Harvard Blvd., Los Angeles, Calif. 90020

Filed Jul. 11, 1989, Ser. No. 378,374

Int. Cl.[5] A41D *1/20*

U.S. Cl. 2—104 **2 Claims**

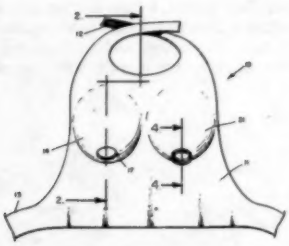
1. A surrogate nursing bib for use by a wearer in promoting bonding with child, said surrogate nursing bib comprising:

a. a bib which is formed out of latex in order to provide a natural-looking background and which has a inner side and an outer side, a cotton lining being disposed on said inner side and at least one pouch being disposed on said outer side, said pouch having an opening;

b. a first set of straps having hook and loop fasteners which are mechanically coupled to said bib in order to secure said bib to the neck of the wearer;

c. a second set of straps having hook and loop fasteners

which are mechanically coupled to said bib in order to secure said bib to the waist of the wearer; and



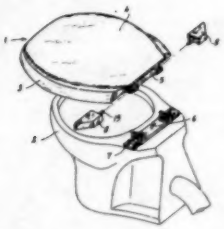
d. at least one container which has a nipple on which an infant may suckle, said container being disposed in said pouch so that said nipple protrudes through said opening in said pouch.

4,965,889

COVER FOR A TOILET BOWL

Patrick Tissot; Jean Guy, and Claude Patel, all of Nantua, France, assignors to Tissot, S.A., Nantua, France

Filed Feb. 17, 1989, Ser. No. 312,098
Claims priority, application France, Feb. 18, 1988, 88 02503
Int. Cl.[5] A47K *13/00*
U.S. Cl. 4—234 **1 Claim**



1. In a toilet bowl cover having a seat and lid, wherein said seat and lid are attached to a back of the toilet bowl, the improvement comprising:

an fixed elongated rectangular base adapted for permanent attachment on a back of said toil bowl to accommodate a removable quick fastening device for removably locking said seat lid and to the base,

a pair of tubular hinge shafts affixed to said seat and lid for pivoting said seat with respect to said lid,

said base having an upper surface containing supports thereon adapted pivotally supported tubular hinge shafts and recess means extending along opposite ends of said base;

said tubular shafts having axial holes therein that permanently hold said seat and lid together in hinged relationship; and

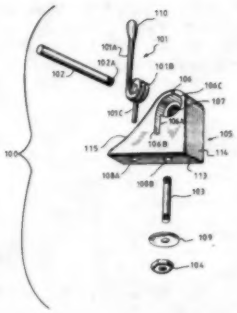
said removable quick fastening device comprising two sliding parts having channel means adapted to slidingly engage said recess means on said base, said device having protuberant shafts that fit in locking relationship with said axial holes in said tubular shafts when slidingly mounted on said base.

4,965,890

SPRING HINGE ASSEMBLY FOR TOILET SEATS

Morgan F. Fischer, 76 Main St., Roslyn, N.Y. 11576

Filed Jun. 5, 1989, Ser. No. 361,236
Int. Cl.[5] A47K *13/12*
U.S. Cl. 4—240 **36 Claims**



1. A hinge assembly for a toilet seat, said hinge assembly comprising:

(a) a spring of integral, single piece construction, said spring comprising a torsion coil portion, a linear seat-raising portion leg extending tangentially from said helical torsion coil portion, and a linear bracing means portion extending tangentially from said helical torsion coil portion;

(b) a seat mounting member comprising

(i) a notch comprising a substantially round portion for receiving said helical torsion coil portion of said spring, and a linear portion extending tangentially from said round portion for receiving said linear bracing means portion of said spring and for providing a backstop for said linear bracing means portion;

(ii) means for retaining a horizontally extending hinge pin, said means for retaining being located concentrically within said round portion of said notch; and

(iii) means for mounting said seat mounting member to a toilet bowl; and,

(c) a hinge pin for pivotally connecting a toilet seat to said seat mounting member, said hinge pin being coaxially receivable through said helical torsion coil, and said hinge pin having a first end for being retained by said seat mounting member and a second end for being retained by said toilet seat.

4,965,891

SAFETY LATCH FOR A TOILET TANK VALVE

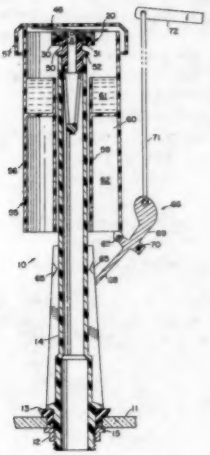
Bruce A. Antunez, 1143 Indian Springs, Glendora, Calif. 91740

Filed Apr. 3, 1989, Ser. No. 333,061
Int. Cl.[5] E03D *1/36*
U.S. Cl. 4—366 **1 Claim**

1. A toilet tank water inlet valve of the type having a riser with a vertical axis, a valving mechanism atop the riser, and an inverted cup-type float, having a bottom edge, said float surmounting said valving mechanism to open the valve mechanism to flow when the float moves axially on said riser to a lower level and to close the valve mechanism to flow when the float moves axially on said riser to an upper level, the improvement comprising:

a releasable latch comprising a pawl at one end and a lever at the opposite end and being pivotally mounted to said bottom edge between said pawl and lever, said lever being weighted such that it tends to rotate one end of said pawl about said pivotal mount into contact with said riser, said riser including a notch into which said end can engage to hold the cup at an upper extreme and to prevent downward movement of the cup unless said one end of said

pawl is withdrawn from said notch, said pawl and lever permitting free downward sliding movement of said cup relative to the riser except when said one end of said pawl is engaged in said notch, and a flexible linkage attached at



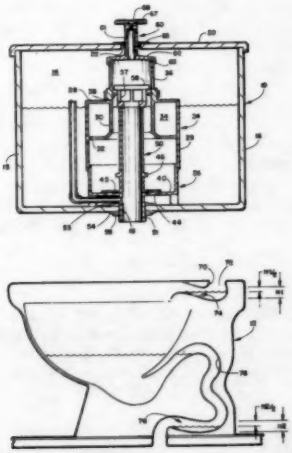
one end to said lever and attached to a flush lever at the other end such that only normal operation of said flush lever will disengage said one end of said pawl from said notch.

4,965,892

SYPHONIC FLUSH TOILET

James B. McDonough, 3306 San Carlos Dr., Spring Valley, Calif. 92077

Filed Apr. 27, 1989, Ser. No. 343,615
Int. Cl.[5] E03D *1/06*
U.S. Cl. 4—368 **12 Claims**



1. A syphonic flush toilet comprising:

a tank having a front wall, a rear wall, a pair of laterally spaced side walls, and a bottom wall that forms an open top water chamber, a lid for said tank having a plunger aperture therein, a drain outlet formed in said bottom wall;

a syphon assembly formed of a floating top housing member and a bottom housing member, said floating top housing member having a top wall having a downwardly extending annular outer side wall having a predetermined width, said bottom housing member having a bottom wall having an upwardly extending annular outside wall having a predetermined width, said annular outer side wall and said annular outside wall being matingly telescopically connected to each other about a vertical axis;

means for making said floating top housing bouyant;

an elongated vertically oriented discharge pipe having a top end and a bottom end, said bottom end passing through the drain outlet of said tank, said discharge tube extending upwardly within the interior of said floating top housing member and said bottom housing member;

locking means for securing the bottom end of said discharge pipe in said drain outlet with a water tight seal;

means for flushing said toilet comprising a plunger assembly having a top end that extends upwardly through the plunger aperture in said lid, the bottom end of said plunger assembly is connected to said floating housing member whereby downward pressure on said plunger assembly will force said floating top member downwardly to force water within said syphon assembly upwardly until it flows into the top end of said discharge tube to create a syphon that will extract a predetermined volume of water from the tank; and

the above structure being in combination with a toilet bowl having an upper serpentine discharge passage molded herein and configured to form a first half trap for preventing air from breaking the syphon from the water tank during the flushing operation.

4,965,893

HYDROTHERAPY MASSAGE METHOD AND APPARATUS

Melvyn L. Henkin, 5011 Donna Ave., Tarzana, Calif. 91356, and Jordan M. Laby, 3038 Bayshore, Ventura, Calif. 93001

PCT No. PCT/US88/02344, § 371 Date Feb. 24, 1989, § 102(e) Date Feb. 24, 1989, PCT Pub. No. WO89/00417, PCT Pub. Date Jan. 26, 1989
Continuation-in-part of Ser. No. 138,514, Dec. 23, 1987, Pat. No. 4,813,086, which is a continuation-in-part of Ser. No. 72,409, Jul. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 843,151, Mar. 24, 1986, Pat. No. 4,679,258. This PCT application Jul. 12, 1988, Ser. No. 455,454
Int. Cl.[5] A61H *33/02*
U.S. Cl. 4—542 **21 Claims**

1. Hydrotherapy apparatus for discharging a fluid stream useful for impacting against and massaging an area of a user's body, said apparatus comprising:

supply means including a cavity and means for discharging a water jet along a defined axis into said cavity for creating a suction therein;

an elongated rigid conduit including a tubular supply section having a supply orifice and a tubular discharge section having a discharge orifice;

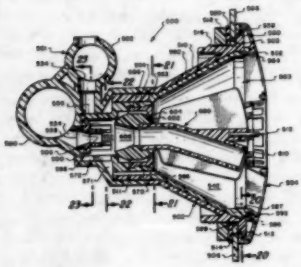
means mounting said conduit with said supply orifice opening to said cavity whereby water supplied from said jet will flow through said conduit to said discharge orifice;

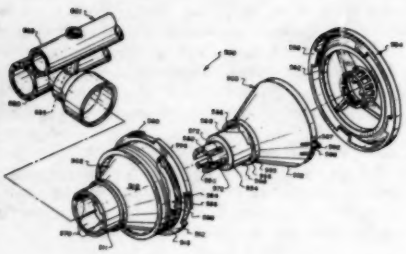
said discharge orifice being oriented to discharge a water stream having a primary massage component extending substantially in the direction of said conduit elongation and a secondary thrust component extending substantially perpendicular to said conduit elongation;

said mounting means including swivel means supporting said conduit supply section for rotation about the axis of said supply section and about vertical and horizontal axes oriented perpendicular to said supply section axis whereby said discharge orifice can translate along a random path describing a substantially planar area;

passageway means for drawing water from outside said

conduit into said cavity to mitigate the effect of said suction on said conduit; and





control means for varying the flow of water through said passageway means.

4,965,894

MIXING DEVICE

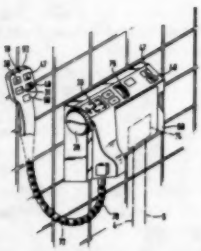
Heinz G. Baus, Hünibach-Thun, Switzerland, assignor to Altura Leiden Holding B.V., Maastricht, Netherlands

Filed Oct. 28, 1988, Ser. No. 263,902

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736406; Oct. 11, 1988, 8116856

Int. Cl.[5] A47K *3/22*

U.S. Cl. 4—605 **8 Claims**



1. A mixing device for showers or baths comprising:

a mixing fitting to which hot and cold water may be fed and which comprises an element for adjusting the mixing ratio;

an electronic control-unit;

an input-unit;

a dispenser having at least one lotion-container for the accommodation of a preparation, wherein said mixing fitting, on the one hand, and said dispenser, on the other hand, are designed and arranged as separate operating groups;

a supply-device by means of which, upon actuating said input-unit, the preparation may be released from said dispenser; and

a single housing in which said mixing fitting, said electronic control-unit, said input-unit, said dispenser and said supply device are arranged, wherein said housing comprises a first cover which is connected debatably thereto and is adapted to be opened, and at least one container for the preparation being arranged behind said cover, said container being movably arranged on guides and being movable out of said housing when said first cover is opened.

4,965,895

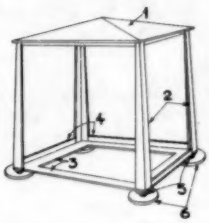
EARTHQUAKE SHELTER WITH BED SUPPORT AND CANOPY

Valentin N. Shustov, 536¼ N.Genesee Ave., Los Angeles, Calif. 90036

Continuation-in-part of Ser. No. 214,935, Aug. 29, 1988, abandoned. This application May 26, 1989, Ser. No. 363,592

Int. Cl.[5] A47C *29/00*

U.S. Cl. 5—414 **1 Claim**



1. A system adapted to protect an occupant of a bed during an earthquake, comprising a generally rectangular frame system defined by a generally rectangular protective cover supported by generally vertical supports at its corners, each said support including a ball bearing at its lower end, each said ball bearing being supported on a pedestal plate having a concave upper surface, the ball bearings supported on the pedestal plates permitting movement of the frame system during an earthquake, the frame system further including generally horizontal shelves located between said supports, said horizontal shelves being circumscribed by generally vertical confiners, said shelves being of a sufficient size to support a bed beneath said protective cover, the frame system being designed and being made from materials adapted to protect an occupant of the bed supported on the shelves of the frame system from structures collapsing on the frame system during an earthquake.

4,965,896

FOLDABLE DIAPER-CHANGING TABLE

Frederick Berger, 22 High Oak Ct., Huntington, N.Y. 11743, and Mindy S. Berger, 52 Derby Pl., Smithtown, N.Y. 11787

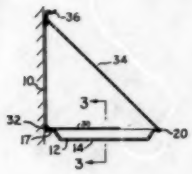
Filed Mar. 26, 1990, Ser. No. 498,423

Int. Cl.[5] A47D *5/00*

U.S. Cl. 5—424 **5 Claims**

1. A fold-up table for changing a baby's diapers, comprising first and second horizontally spaced vertical straps adapted for securement against a room wall; a hollow rectangular tray that includes a flat bottom wall, a peripheral side wall extending entirely around the periphery of said bottom wall at an acute angle to the bottom wall plane, and a peripheral rim wall extending outwardly from said side wall in a plane that parallels the bottom wall plane; said rectangular tray having two

longitudinal edges defining a tray major axis and two transverse edges defining a tray minor axis; third and fourth spaced straps secured flatwise to said rim wall of the tray; said third and fourth straps extending parallel to the minor axis of the tray at opposite transverse edges of the tray; a first horizontal axis hinged connection between said first strap and said third



strap, and a second horizontal axis hinged connection between said second strap and said fourth strap, whereby the tray can be swung between an upright storage position facing the room wall and a use position extending horizontally normal to the room wall; said straps being located so as to be substantially covered by the tray when the tray is in its upright storage position.

4,965,897

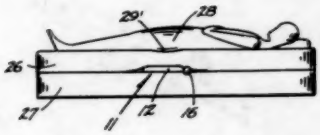
ADJUSTABLE APPENDAGE FOR MATTRESS PROVIDING MEANS

Clarence R. Taylor, 28 Woodside Dr., Penfield, N.Y. 14526

Filed Mar. 21, 1990, Ser. No. 496,643

Int. Cl.[5] A47C *21/06*

U.S. Cl. 5—446 **4 Claims**



1. An adjustable appendage for mattress for inserting into a crosswise position between a mattress and box-spring or other firm support means in the pelvic bone area comprising;

a rectangular base board or support member;

a containment and spacer assembly permanently affixed to each end of said base board or support member;

a flexible metal plate, with reinforcement angles, contained by and extended between said containment and spacer assemblies;

an inflatable rubber tube device fastened centrally to said base board and support member and on which rests said flexible metal plate;

a rubber bulb air pump, air lock-valve assembly and connecting hose sealed to said inflatable rubber tube device;

a fabric covering material for enclosing said assembled adjustasble appendage.

4,965,898

INNOVATIVE STRUCTURE OF CUSHION

Chen Y. So, No. 359, Hua Hsing St., Chu Pei Town, Hsing Chu County, Taiwan

Filed Oct. 27, 1989, Ser. No. 427,488

Int. Cl.[5] A47C *27/00*

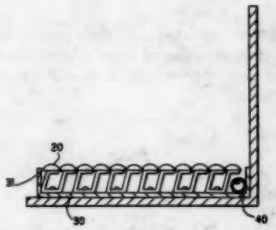
U.S. Cl. 5—468 **2 Claims**

1. A cushion, comprising:

a cushion body formed of an elastic material;

a plurality of spring plates fixedly coupled within said cushion body, each of said spring plates being formed to a metal material composition and having a substantially U-shaped configuration, each of said plurality of spring plates comprising a pair of inclined side plates disposed in spaced parallel relation one to the other defining a base portion therebetween, said base portion being disposed at a bottom portion of said side plates and having a hole formed therethrough at a predetermined position for fixation of said spring plate, said pair of inclined side plates each being inclined in a predetermined direction and having an upper portion transversely directed in said predetermined direction to define a respective pair of flat planes;

a plurality of pairs of spherical elements fixedly coupled to respective pairs of said flat planes of said plurality of



spring plates, each of said plurality of spherical elements having (1) a smooth surface and an oval contour, and (2) a substantially flat bottom surface having dimensions of greater value than corresponding dimensions of said flat planes, said flat bottom surface being fixedly coupled to a respective flat plane of one of said inclined side plates;

means for fastening said plurality of spring plates within said cushion body, said fastening means coupling each of said spring plates through said hole formed in said base portion of said spring plate, said spring plates being disposed in spaced relation wherein a bottom peripheral portion of each of said spherical elements is in respective contact with bottom peripheral portions of respective adjacent spherical elements to form an upper surface of substantially continuous beads.

4,965,899

AIR CUSHION FOR CHAIR AND CHAIR UTILIZING THE AIR CUSHION

Hiroshi Sekido, Chiba, and Toshimichi Hioki, Gifu, both of Japan, assignors to Okamoto Industries,Inc., Tokyo, Japan

Continuation of Ser. No. 41,132, Feb. 20, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,560

Claims priority, application Japan, Oct. 15, 1985, 60-230600; Nov. 20, 1985, 60-179392; Nov. 20, 1985, 60-179393; Jun. 28, 1986, 61-99312; Jul. 16, 1986, 61-168939

Int. Cl.[5] A47C *27/08*

U.S. Cl. 5—453 **26 Claims**

1. A vehicle seat assembly which comprises

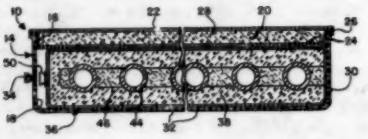
a seat cushion which provides an upper surface on which a user sits, said upper surface having a contour,

an inflatable bag device positioned within said seat cushion, said inflatable bag device comprising first and second generally rectangular outer fabric members which are in direct sealing contact with one another along only peripheries thereof, a rib fabric member connected between said first and second outer fabric members inwardly of said peripheries thereof, each said first and second fabric member being made of a laminated sheet member consisting of a meshed middle fabric layer sandwiched between two thermoplastic synthetic resin layers, the two layers being adhered to each other through the meshes of the middle layer,

an air port sealingly connected to one of said first and second outer fabric members, and

a pipe means connected to said air port to enable air to be supplied to or removed from said inflatable bag device, thereby changing the contour of said upper surface of said seat cushion.

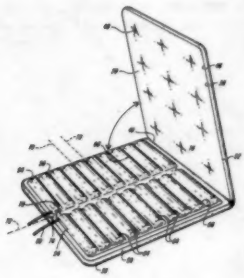
4,965,900
ABSORBENT DEVICE
Gary D. Smith, 1901 Highway, 41 North, Rm. #43, Evansville, Ind. 47711
Filed Oct. 25, 1989, Ser. No. 426,241
Int. Cl.[5] A61G *9/00*
U.S. Cl. 5—463 19 Claims



1. An absorbent device for a bed or the like comprising:
a bag like container having a moisture impervious bottom and moisture impervious peripherial sides, a non-absorbent, moisture permeable fabric like top and a non-absorbent moisture permeable divider dividing the container into an upper compartment and a lower compartment;
a non-absorbent, moisture permeable, resilient cushion in said top compartment; and
a filter cushion member including a moisture absorbing element removably received in said bottom compartment.

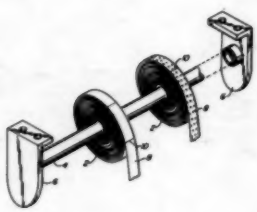
4,965,901
FUTON WITH INFLATABLE CORE
Gaudry Normand, 6515 Place Monette, Charlesbourg, Quebec, Canada (G1H 6M7)
Filed Aug. 21, 1989, Ser. No. 395,993
Int. Cl.[5] A47C *27/00*
U.S. Cl. 5—465 5 Claims

1. A flexible, foldable futon comprising opposing flexible, foldable, covering layers,
at least one of said covering layers comprising solid cushioning material and a casing containing said cushioning material, and being separately tufted and
an inflatable, flexible foldable first pneumatic cushioning layer,
said pneumatic layer comprising an inflatable casing,
said casing providing means to facilitate substantially continuous folding along a plurality of first parallel axes when said pneumatic layer is inflated,
said pneumatic layer being captured between said opposing covering layers and a second pneumatic layer captured between said opposing covering layers and arranged to be co-planer with said first pneumatic layer,



and said futon provides means to facilitate folding along a second axis perpendicular to said first axes.

4,965,902
SOCK JOINING METHOD
Rodney E. Mazzoli, 7210 E. Cypress Head Dr., Parkland, Fla. 33067
Continuation-in-part of Ser. No. 148,744, Jan. 14, 1988, abandoned. This application Jul. 10, 1989, Ser. No. 377,693
Int. Cl.[5] D06F *35/00*
U.S. Cl. 8—150 9 Claims

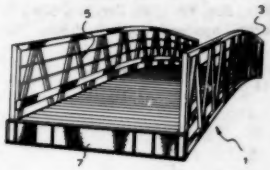


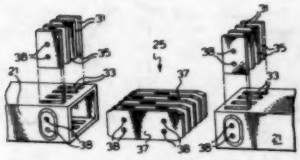
1. A method for joining a pair of socks in preparation for laundering the pair of socks in a load of wash, the pair of socks belonging to a first group, comprising the following steps:
selecting a first supply of lengths of material from a plurality of visually distinguishable supplies of lengths of material according to the identity of the group of the pair of socks;
removing a length of material, having first and second ends, from the first supply of lengths of material;
wrapping the length of material around the pair of socks; and
securing the wrapped length of material in position around the pair of socks so to keep the pair of socks together in the load of wash and permit the pair of socks to be readily identifiable as belonging to the first group.

4,965,903
MODULAR BRIDGE
Christopher G. Bisch, Elmira, Canada, assignor to Kitchener Forging Ltd., Kitchener, Canada
Filed Jul. 27, 1989, Ser. No. 386,453
Claims priority, application Canada, Feb. 17, 1989, 591424
Int. Cl.[5] E01D *1/00*
U.S. Cl. 14—1 10 Claims

1. A splice for connecting two ends of hollow tubing, comprising:

(a) a plurality of ribs within each said two ends of hollow tubing for defining respective slots therewithin:
(b) a plurality of plates adapted for insertion into said slots within each said two ends of hollow tubing; and





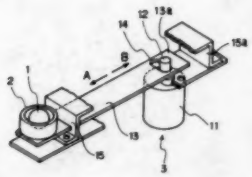
(c) means for securing said plurality of plates within said respective slots, whereby said plurality of plates form an arrangement of interlocking fingers relative to said respective slots for providing a rigid connection between said two ends of hollow tubing.

4,965,904

CONTACT LENS CLEANING DEVICE

Toyoyasu Tanaka, Nagoya; Yasuyoshi Yamamoto, Komaki, and Yuzou Kaga, Nagoya, all of Japan, assignors to Menicon Co., Ltd., Nagoya, Japan

Filed Nov. 6, 1989, Ser. No. 431,955
Claims priority, application Japan, Nov. 9, 1988, 63-146049
Int. Cl.[5] A47L *1/02*; B08B *3/00*
U.S. Cl. 15—97.1 3 Claims



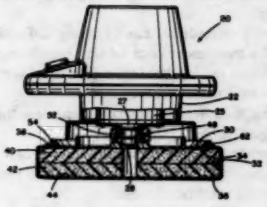
1. A contact lens cleaning device comprising:
(a) a cleaning ball;
(b) a cleaning vessel formed with a recessed cleaning chamber adapted to removably receive the cleaning ball with a contact lens between the cleaning chamber and cleaning ball; said cleaning chamber comprising a bottom concave surface which is curved complimentarily to the curvature of the lens and ball so that the lens can be mounted in face-to-face contact therebetween; and
(c) a vibrator connected to said cleaning vessel for vibrating the cleaning vessel.

4,965,905

APPARATUS FOR WAXING AND POLISHING

Roy S. Kitahata, Fullerton, Calif., and Kiyoshi Iha, Elk Grove Village, Ill., assignors to The Chamberlain Group, Elmhurst, Ill.

Filed Mar. 20, 1989, Ser. No. 325,898
Int. Cl.[5] B60S *3/06*; A46B *13/00*
U.S. Cl. 15—97.1 9 Claims



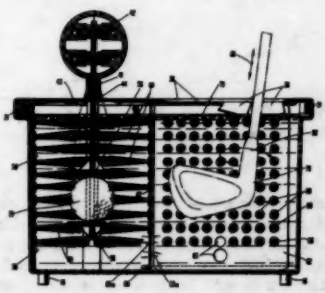
1. Apparatus for use in applying wax to an object and/or polishing the waxed object, said apparatus comprising:
a housing, an electric motor disposed within said housing, and an operating shaft, driven by said motor;
a generally disk-shaped pad holder having a hub connected to said shaft, said holder having a first surface facing said housing and a second surface disposed away from said housing;
a pad of sponge-like material carried by said holder and positioned against said holder second surface;
a bonnet of cloth material disposed about said pad and having means adjacent its periphery for holding said pad to retain said bonnet installed about said pad, said holder including an annular lip disposed adjacent the periphery of said holder, said lip extending toward said housing and radially outwardly, the bonnet in its installed condition engaging said lip to locate said bonnet and limit its inward movement, said pad extending radially outwardly of said holder, said pad and said lip defining an annular cavity for receiving the means for holding of said bonnet.

4,965,906

COMBINATION GOLF BALL AND CLUB HEAD CLEANER

Edward Mauro, 4090 Daventry Ln., Palm Harbor, Fla. 33563

Filed Feb. 3, 1989, Ser. No. 306,426
Int. Cl.[5] B08B *1/00*
U.S. Cl. 15—104.92 17 Claims



1. A device that cleans golf balls; comprising:
a first cleaning chamber having cylindrical sidewalls;
said first cleaning chamber having a plurality of horizontally disposed bristle members that extend radially inwardly

relative to said sidewalls, said bristle members extending substantially from a top part of said cleaning chamber to a bottom part thereof;

a flexible pad member from which said bristle members extend;

a generally tubular in configuration golf ball retention member;

said retention member having a diameter greater than a golf ball's diameter;

said retention member having a length less than a golf balls' diameter;

a substantially cylindrical cavity being collectively defined by radially innermost ends of said bristle members;

said cylindrical cavity having a diameter greater than the length of said retention member;

said cylindrical cavity having a diameter less than the diameter of a golf ball;

a plate member that carries said retention member;

a handle means being fixedly secured to said plate member in surmounting relation thereto;

a second cleaning chamber;

said second cleaning chamber having a first plurality of horizontally disposed bristle members disposed therein, extending in a first common direction;

said second cleaning chamber having a second plurality of horizontally disposed bristle members disposed therein, extending in a second common direction opposite to said first direction;

opposing ends of said first and second plurality of bristle members being in closely spaced juxtaposition to one another so that a golf club head is insertable therebetween;

means bringing said first and second cleaning chambers into fluid communication with one another;

said means being an aperture means formed in said pad member.

4,965,907

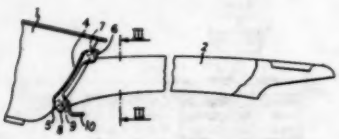
UTENSIL HAVING A DETACHABLE HANDLE MEMBER

Gerd-Diethard Baumgarten, Wilnsdorf-Wilden, Fed. Rep. of Germany, assignor to Heinrich Baumgarten KG Spezialfabrik fuer Beschlagteile, Neunkirchen, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 381,076

Int. Cl.[5] B65D *25/28*

U.S. Cl. 16—114 A **7 Claims**



1. A utensil having a detachable handle member, comprising a closed ring which is secured to said utensil and which has on opposite sides thereof first and second cavities, said first cavity being vertically higher than said second cavity, and first and second members on said handle member which are respectively releasably engageable with said first and second cavities, one of said first and second members being a tongue, and the other thereof having a movable locking portion and means for yieldably resisting movement of said locking portion out of one of said cavities.

4,965,908

METHOD AND APPARATUS FOR SEPARATING THE HEART AND THE LUNGS OF A HEART-LUNGS PACKAGE OF POULTRY

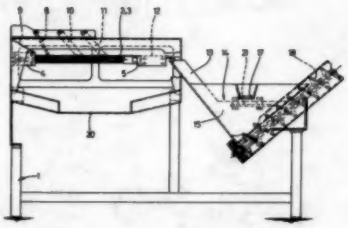
Cornelis Meyn, Oostzaan, Netherlands, assignor to Meyn Machinefabriek B.V., Oostzaan, Netherlands

Filed Sep. 19, 1989, Ser. No. 409,253

Claims priority, application Netherlands, Nov. 15, 1988, 8802815

Int. Cl.[5] A22C *21/00*

U.S. Cl. 17—11 **15 Claims**



1. A method for separating the heart from the lungs of poultry where the heart and lungs are interconnected by muscle tissue in a heart and lung package, comprising the steps of:

(a) conveying said heart and lung package along a first path;

(b) separating said muscle tissue from said heart and lungs to loosen said heart from said lungs;

(c) separating said heart from said lungs;

(d) discharging said heart along a second path; and

(e) discharging said lungs along a third path.

4,965,909

SAFETY CONTROL FOR POWER OPERATED EQUIPMENT

Timothy J. McCullough, 833 Aurora Rd., Vermillion, Ohio 44089, and Giorgio Grasselli, Via L. Roversi No. 2, 42020 Albinea Re, Italy

Continuation-in-part of Ser. No. 253,114, Oct. 4, 1988, abandoned. This application May 19, 1989, Ser. No. 354,890

Int. Cl.[5] A22B *5/16*

U.S. Cl. 17—21 **33 Claims**

1. A safety control system for power operated equipment of the type having a rotating metal component including:

(a) a reversible electric motor operatively connected to the metal component for rotating said component;

(b) control means for operatively connecting the motor to the rotating metal component;

(c) electrical conductive gloves adapted to be worn by an operator of the power operated equipment;

(d) moisture impervious dielectric gloves adapted to be worn by the operator over the electrical conductive gloves; and

(e) said control means further including safety switch means electrically connected to the conductive gloves and rotating metal component for reversing the direction of rotation of the motor and the direction of rotation of the rotating metal component to prevent injury to the operator if at least one of the operator's conductive gloves contacts the rotatable metal component.

4,965,910

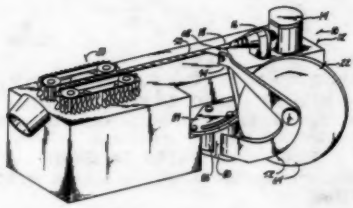
ENCASED PRODUCT AND METHOD AND APPARATUS FOR ENCASING SAME

Ray T. Townsend, Des Moines; David W. Smith, West Des Moines, and Robert M. Dykes, Urbandale, all of Iowa, assignors to Townsend Engineering Company, Des Moines, Iowa

Continuation-in-part of Ser. No. 187,351, Apr. 28, 1988. This application Apr. 4, 1989, Ser. No. 333,996

Int. Cl.[5] A22C *21/00*

U.S. Cl. 17—49 **10 Claims**



1. An apparatus for encasing a plastic product, comprising: a support;

an elongated casing strip having opposite side edges;

first means on said support for forming said strip into a plurality of helical revolutions with said side edges of said strip within each one of said helical revolutions frictionally engaging and overlapping said side edges of said strip within those of said helical revolutions adjacent said one helical revolution so as to form an elongated tubular casing;

second means on said support for introducing said plastic product into said casing;

said overlapped edges of said casing strip being sufficiently damp from the presence of water-based moisture and being sufficiently overlapped to create enough frictional cohesiveness to maintain said helical revolutions in a self-contained tubular casing to contain said plastic product;

the moisture content of said casing strip being 15% to 45% by weight.

4,965,911

DECONTAMINATION OF MEAT

Kenneth R. Davey, Seven Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Australia

PCT No. PCT/AU88/00335, § 371 Date May 4, 1989, § 102(e) Date May 4, 1989, PCT Pub. No. WO89/01738, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 31, 1988, Ser. No. 353,623

Claims priority, application Australia, Sep. 4, 1987, PI4151

Int. Cl.[5] A22C *21/04*

U.S. Cl. 17—51 **20 Claims**

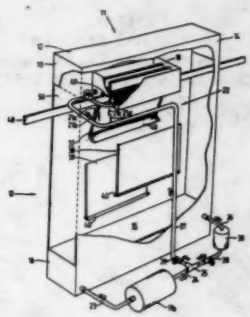
1. Decontamination apparatus for decontamination of meat carcasses including:

(i) a main housing;

(ii) supply means for supplying liquid to the main housing;

(iii) distribution means for separating the liquid into a plurality of different sheets for downward passage through the housing;

(iv) means for suspending a carcass in the housing; and



(v) baffle means located within the housing below the distribution means for deflecting said plurality of different sheets onto an outer surface of the carcass.

4,965,912

METHOD AND APPARATUS FOR SEVERING THE SLIVER IN SLIVER COILERS

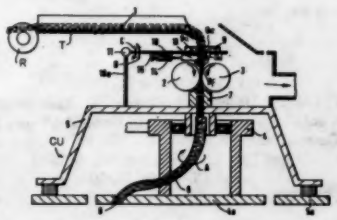
Jürgen Klüttermann, and Helmut P. Möges, both of Mönchengladbach, Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 319,579

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1988, 3807239

Int. Cl.[5] D01G *27/00*

U.S. Cl. 19—159 R **20 Claims**



3. A sliver coiler for depositing a running sliver into a coiler can, comprising:

(a) a driven roller pair including two cooperating rollers arranged for advancing the sliver passing therebetween in a feed direction;

(b) a sliver trumpet supported upstream of said roller pair as viewed in the feed direction and having a passage through which the sliver runs; said passage having a sliver entrance and a sliver exit; said sliver trumpet having a first position in which said sliver exit immediately adjoins and faces said roller pair and a second position in which said sliver exit is at a greater distance from said roller pair than in said first position;

(c) a coiler head arranged downstream of said roller pair and being arranged for receiving the sliver and forwarding the sliver into a coiler can;

(d) moving means for displacing said sliver trumpet between said first and second positions; and

(e) clamping means for grasping the sliver at a location between said sliver entrance of said sliver trumpet and said roller pair; said clamping means having a clamping

position in which the sliver is firmly grasped thereby and an open position in which the sliver is released from the clamping means.

4,965,913

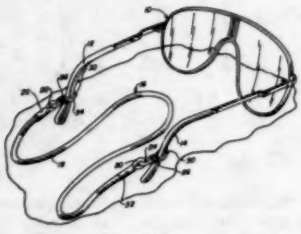
STRAP FOR GLASSES

Joseph Sugarman, 26 Princeville Ln., Las Vegas, Nev. 89113

Filed Aug. 18, 1989, Ser. No. 395,525

Int. Cl.[5] A44B *21/00*

U.S. Cl. 24—3 C 10 Claims



5. In a strap for glasses which comprises a strap member; a flexible temple bar loop carried at each end of the strap member; a sliding member carried on each temple bar loop in surrounding and constricting relation, to permit size adjustment of a retention loop formed by the sliding member and the outer portion of the temple bar loop, said sliding member being formed by a coiled wire to define a substantially tubular structure through which the temple bar loop extends in flattened configuration, the improvement comprising, in combination:

an enlargement defined by said outer portion of each temple bar loop, to inhibit removal of each sliding member from its relation with its respective temple bar loop, said enlargement being positioned substantially at an end opposed to said strap member and comprising a substantially spherical member, integral with the remainder of said temple bar loop.

4,965,914

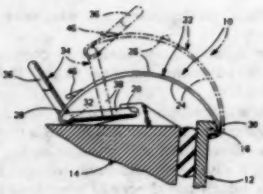
OVERCENTER CLAMP

Keith A. Coafer, Holly, and Michael E. Rasmussen, Grand Blanc, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 21, 1990, Ser. No. 483,203

Int. Cl.[5] F16L *23/00*

U.S. Cl. 24—270 4 Claims



1. An overcenter clamp comprising:

a flexible band having an inner side, an outer side, a hinge end and a hooked end, said hooked end facing said inner side and being adapted to grasp a margin of a first member;

a lever arm hingedly connected to said hinge end, said lever arm having a handle facing said outer side and a pivot link facing said inner side, said pivot link having an end adapted for insertion into a socket of a second member enabling the first and second members to be clamped together by placing them adjacent one another so that the socket is adjacent and parallel to the margin, grasping the margin with said hooked end, inserting said pivot link into the socket, and rotating said handle away from said band to a point wherein said band is tensioned and bears upon the second member; and

a retaining means connected to said band adjacent said hinge end, said retaining means being engageable with said lever arm to resist rotation of said lever arm with respect to said band when said lever arm is in an open position wherein the angle between said lever arm and band is sufficient so that, when said hooked end grasps the margin, said pivot link is away from the socket.

4,965,915

PLUG FOR THE BEARING OF AN AUTOHOIST ARM AGAINST A MOTOR-VEHICLE BODY

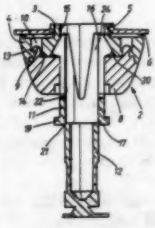
Gerd Steininger, Bobligen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed May 31, 1989, Ser. No. 359,290

Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818464

Int. Cl.[5] B60S *11/00*

U.S. Cl. 24—607 10 Claims



1. Plug for a bearing of an autohoist arm on a motor vehicle body having an elastic receiving means located in a receiving orifice and supported on a body surface of the motor vehicle and a dimensionally stable spacer means positioned in front of the receiving means comprising;

snap fit connection means for connecting the spacer means to the receiving means;

retention peg means for securing the receiving means and the spacer means to the receiving orifice, the retention peg means being insertable into an axial bore in the receiving means and the spacer means;

inner radially projecting means at an inner end of the retention peg means for engaging behind the receiving means and an edge of the receiving orifice, the inner radially projecting means being elastically deformable for insertion through the axial bore;

outer radially projecting means at an outer end of the retention peg means for engaging a stop in the spacer means for positioning the retention peg relative to the receiving means and the spacer means; and

a locking pin means for preventing elastic deformation of the inner radial projecting means of the retention peg means, the locking pin means being press fitted into a bore of the retention peg means.

4,965,916
MEANS FOR THE INTERLACING OF YARN

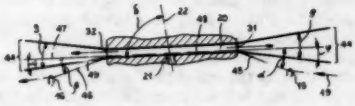
Hulasi Artunc, Pfullingen; Gerhard Egbers, Reutlingen; Helmut Weinsdörfer, Pliezhausen, and Jürgen Wolfrum, Eberubach, all of Fed. Rep. of Germany, assignors to Deutsche Institute fur Textil- und Faserforschung Stuttgart Stiftung des Offentlichenrechts, Dekendorf, Fed. Rep. of Germany

PCT No. PCT/EP87/00453, § 371 Date Apr. 5, 1989, § 102(e) Date Apr. 5, 1989, PCT Pub. No. WO89/01539, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 15, 1987, Ser. No. 348,698

Int. Cl.[5] D02J *1/08*; D02G *1/16*

U.S. Cl. 28—271 30 Claims



1. Interlacing means for interlacing multifilament yarns comprising:

a yarn channel having an exit and an entrance at opposite ends of said channel;

a yarn guide at a distance adjacent each of said exit and entrance ends;

means including at least one blow nozzle for introducing a directed stream of compressed air into said channel for interlacing the filaments of a yarn passing through said channel with one another; and

wherein said yarn is positioned within said channel to extend generally in a longitudinal direction of said channel so as to be on a rim of an exit opening of said blow nozzle, said yarn guides being so positioned that the yarn, measured in taut condition and with the compressed air supply shut off, both upon entering and exiting said channel experiences a change in direction of at least an 8° angle but less than 90°, and said blow nozzle is oriented to intersect said yarn channel at a blow angle of less than 90°.

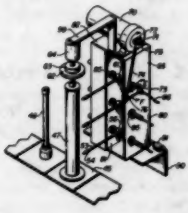
4,965,917
BOBBIN STRIPPING SYSTEM

John H. Ferguson, P.O. Box 116, Linwood, N.C. 27299

Filed Jul. 5, 1989, Ser. No. 375,597

Int. Cl.[5] B24C *1/00*

U.S. Cl. 28—295 20 Claims



1. A bobbin stripping system to remove residual rovings and textile fibers from a central core element comprising:

(a) first endless conveyor means to receive and carry bobbins having residual rovings wound thereon;

(b) an automatic stripping device including a series of high pressure fluid nozzles having means to oscillate said nozzles in a vertical plane along the longitudinal axis of said bobbins and directing a high pressure fluid onto the residual rovings to be removed with such pressure and pattern so as the rovings are severed and washed away from said bobbins;

(c) second conveyor means to remove stripped rovings from the stripping device;

(d) third conveyor means to remove stripped bobbins for collection of said bobbins for reuse.

4,965,918
PROCESS AND APPARATUS FOR TREATMENT OF TEXTILE FABRICS

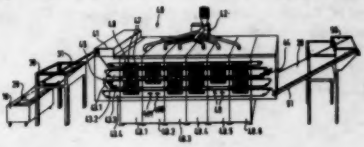
Berthold Magin, Hasuloch, Fed. Rep. of Germany, assignor to MTM Obermaier GmbH

Filed Sep. 5, 1989, Ser. No. 403,605

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3829988

Int. Cl.[5] F26B *13/02*, *13/00*; D06C *7/00*

U.S. Cl. 26—18.5 29 Claims



11. An apparatus for treatment of textile fabrics, comprising:

conveyor means for moving the fabric;

means for blowing air streams against the fabric alternately from above and below; and

means for sucking air streams, arranged directly opposite said blowing means.

4,965,919
POTENTIAL BULKY POLYESTER ASSOCIATED BUNDLES FOR WOVEN OR KNITTED FABRIC AND PROCESS FOR PRODUCTION THEREOF

Takayoshi Fujita; Hisao Nishinaka, both of Shiga; Michio Ohota, Osaka; Yoshihisa Dammoto, Osaka, and Shigeo Nagira, Osaka, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed May 15, 1989, Ser. No. 352,208

Claims priority, application Japan, Aug. 31, 1988, 63-218941; Aug. 31, 1988, 63-218942

Int. Cl.[5] D02G *1/18*, *1/02*, *3/24*; D02J *1/08*

U.S. Cl. 28—220 38 Claims

1. Potential bulky polyester associated bundles for woven or knitted fabric comprising multi-filament A and multi-filament B, wherein: said associated bundles are interlaced at a degree of interlacing of 20–100 interlaces/m; said associated bundles have a denier ratio of multi-filament A/multi-filament B of 20/80–80/20; said multi-filament A is composed of single fibers of not more than 3 denier; said multi-filament B has a fracture tenacity or to less than 4 g/denier; said multi-filament A has a wet shrinkage at 100° C., SHW (A), of 0 to 5%; said multi-filament B has a wet shrinkage at 100° C., SHW (B), of 5 to 60%; said multi-filament A has a dry shrinkage at 160° C., SHD (A), of −15 to 0%; and said multi-filament B has a dry shrinkage at 160° C., SHD (B), so that the difference of SHD (B) −SHD (A) is not less than 5%.

26. A process for producing polyester fabric which comprises:

twisting associated multi-filament A and multi-filament B, wherein said multi-filament A is spontaneously heat extensible and has a wet shrinkage at 100° C., SHW (A), of 0 to

5% and a dry shrinkage at 160° C. SHA (A), of −15 to 0%, multi-filament B is heat shrinkable and has a wet shrinkage at 100° C., SHW (B), of 5 to 60% and a dry shrinkage at 160° C., SHD (B), so that the difference of SHD (B) − SHD (A) is not less than 5%, and said multi-filaments A and B are interlaced at a degree of interlacing of 20–100 interlacings/m;

twist setting or sizing the associated multi-filaments A and B at a temperature not higher than 85° C.;

drying the twist-setted or sized associated multi-filaments A and B; and

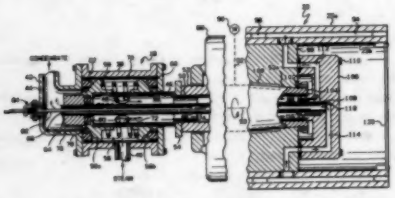
weaving the dried associated multi-filaments A and B with the multi-filaments A and B as warp or weft.

4,965,920

FLUID HEATED ROLL APPARATUS AND METHOD

Sanford N. Smith, Spartanburg, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 7, 1989, Ser. No. 377,505
Int. Cl.[5] B21B *1/08, 27/02, 31/08*
U.S. Cl. 29—112 **20 Claims**



1. An apparatus comprising:

a hollow member having a cavity defined therein and also having an exterior surface;

means for supplying a hot fluid to said cavity so as to heat the exterior surface of said hollow member;

means for withdrawing fluid from said cavity, said withdrawing means including a rotatable conduit means for receiving fluid therethrough which is fixedly connected to said hollow member;

means for rotating said hollow member, whereby said rotatable conduit means rotates with said hollow member; and

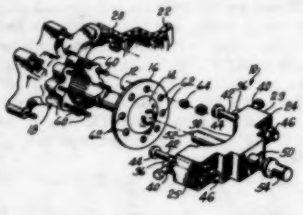
temperature detection means positioned within said rotatable conduit means so as to detect at a temperature detection location within said rotatable conduit means the temperature of fluid flowing therethrough.

4,965,921

FLANGED AXLE SHAFT PULLING ASSIST DEVICE

Gordon W. Priest, 10 Quarry St., Acton, Mass. 01720

Filed Sep. 5, 1989, Ser. No. 402,458
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—254 **9 Claims**



1. An axle shaft pulling assist device for the removal of an axle with a flanged end from studs on a hub of a truck wheel to which it is stuck, comprising:

an elongated main block having a first and a second end, adaptable to extend diametrically across the flanged end said of axle;

a puller means arranged in a pair of parallel bores arranged through each end of said main block, said puller means having a head to extend behind the edge of said flanged axle end;

an adjustable tightener means for forcing the main block against the studs of said hub, generating a biasing force thereagainst;

securement means directly engaged with each end of the main block, said securement means engageable with its respective puller means to prevent each of said puller means from slipping away from behind the flange of the axle end; and

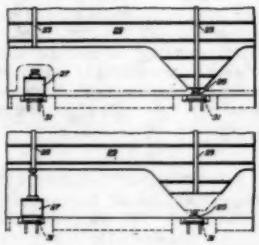
a striker means arranged through a central bore in said main block for jaring the end of the flanged axle, to permit the axle to become unstuck from the hub to which it is attached.

4,965,922

METHOD FOR DISMANTLING A NATURAL GAS HOLDER

Brock R. Settlemier, Piedmont; Steven R. Bone, Walnut Creek; John Tolivaisa, Pacifica, and James E. Nugent, Walnut Creek, all of Calif., assignors to Bigge Crane & Rigging Co., San Leandro, Calif.

Filed Dec. 15, 1989, Ser. No. 451,228
Int. Cl.[5] B23P *19/02*
U.S. Cl. 29—426.4 **7 Claims**



1. A method of dismantling a natural gas holder having vertical support columns disposed around the periphery of said holder to which the enclosure shell of the holder is attached, the method comprising,

providing hydraulic jacks at every other column around the periphery of the shell,

dividing control of the jacks into three approximately equal sectors of adjacent jacks whereby each jack in each sector exerts the same lifting force,

cutting away the columns and adjacent portions of the enclosure shell where each jack is located to permit a partially extended jack to be inserted thereunder,

inserting the jacks under their respective columns and lifting the weight of the gas holder by the jacks in three-point effective support,

cutting the remaining columns loose from their base attachments and providing support cradles at each of said remaining columns,

cutting off the columns and adjacent portions of the enclosure shell where the cradles are located to a height slightly above the height of the cradles,

inserting the cradles under their respective columns and lifting such cradles into contact therewith for preloading with approximately equal lifting force on each of said columns,

lowering the jacks until the weight of the gas holder is supported by the cradles,

cutting away the enclosure shell and columns around the bottom of the gas holder except where the holder is supported by the cradles to a height slightly less than an extended jack,

lifting the weight of the gas holder by the jacks in three-point effective support,

cutting away the enclosure shell and columns above the cradles to a height slightly less than the extension length of the jacks,

lowering the jacks until the weight of the gas holder is again supported by the cradles, and

repeating the previous four steps in their same order until the gas holder has been lowered in height to where it can be dismantled in any other manner.

4,965,923

APPARATUS FOR CONNECTING A CONNECTOR HEAD HAVING A PAIR OF COVER ADAPTORS WITH A CABLE

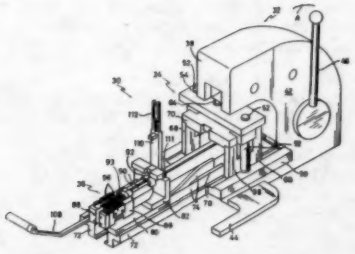
Hiroshi Kumazawa, Akishimashi, Japan, assignor to Japan Aviation Electronics Industry, Inc., Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 405,546

Claims priority, application Japan, Oct. 5, 1988, 63-249814

Int. Cl.[5] H01R *43/00*

U.S. Cl. 29—566.3 **5 Claims**



1. An apparatus for connecting a connector head having a pair of cover adaptors with a cable comprising;

(a) a press unit having a rotatable handle and a push rod connected with the handle to move the push rod in a vertical direction when the handle is rotated,

(b) a die-set unit including an upper arm at the central portion of which the push rod is provided and a lower arm provided with a pair of guide bases, each arm longitudinally extends from one end of the guide base outwardly, a cam rail being secured to the inner side surface of each of the guide bases, the upper surface of the cam rail being formed from a horizontal surface at an outermost end portion of the rail and an upwardly inclined surface at the opposite end to which the rail is connected to the press unit; and

(c) a slide unit including a slide base plate slidably mounted on the guide base, a rear bracket secured to one end of the slide base plate, the rear bracket having a pair of shafts extending in parallel to the guide bese at the central portion thereof, a pair of cover adaptor supporting means for mounting the cover adaptor on which the cable is mounted, the cover adaptor supporting means being pivotally mounted on each of the shafts, the cover adaptor supporting means being a slide block with rollers guided along the surface of the cam rail and a connector holder pivoted to the rear block in order to support the connector in its upright position.

4,965,924

METHODS FOR MAKING ELECTRIC MOTOR PARTS EMPLOYING PALLET WITH REMOVABLE WORKPIECE HOLDER

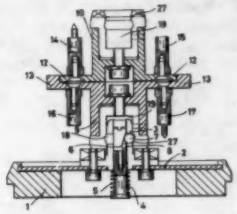
Luciano Santandrea, and Massimo Lombardi, both of Florence, Italy, assignors to Axis S.p.A., Florence, Italy

Filed Mar. 20, 1989, Ser. No. 326,012

Claims priority, application Italy, Dec. 16, 1988, 68113 A/88

Int. Cl.[5] H02K *15/08*

U.S. Cl. 29—596 **3 Claims**



1. The method of processing a workpiece to make a part for an electric motor, said workpiece being a selected one of a plurality of differently configured workpieces for use in making a corresponding one of a plurality of differently configured electric motor parts, comprising the steps of:

providing a pallet member;

providing a workpiece holder having a plurality of pallet-engaging sites and a plurality of workpiece-engaging sites, said pallet member including means for releasably engaging said workpiece holder at any one of said pallet-engaging sites so that said workpiece holder can hold a workpiece at the associated workpiece-engaging site;

positioning said workpiece holder for engagement by said pallet member at the pallet-engaging site associated with the workpiece-engaging site which is adapted to hold the selected workpiece;

positioning said selected workpiece on said workpiece holder at the workpiece-engaging site adapted to hold said selected workpiece;

processing said selected workpiece to produce said electric motor part; and

removing said electric motor part from said workpiece holder.

4,965,925

METHOD OF MAKING AN AXIAL MINIATURE FUSE WITH PLASTIC MOLDED BODY

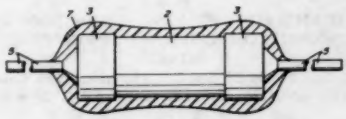
John M. Monter, 920 Dutch Mill Dr., St. Louis, Mo. 63011

Continuation of Ser. No. 123,825, Nov. 23, 1987, abandoned, which is a division of Ser. No. 31,489, Mar. 27, 1987, abandoned.

This application Apr. 17, 1989, Ser. No. 339,881

Int. Cl.[5] H01H *69/02*

U.S. Cl. 29—623 **6 Claims**



1. A method of making an axial miniature fuse, comprising the steps of:

providing a cylindrical fuse having opposed conductive ends with connecting leads projecting outward therefrom, an insulating sleeve therebetween, a fusible link disposed

between said conductive ends and connected to said ends with solder; and

injection molding a plastic coating around the cylindrical fuse such that the fuse is encapsulated and the connecting leads project outward from said plastic coating.

4,965,926

TENSIONING ASSEMBLY APPARATUS HAVING TRANSDUCERS MOUNTED ON THE PROJECTIONS FOR TENSIONED RETAINING RINGS

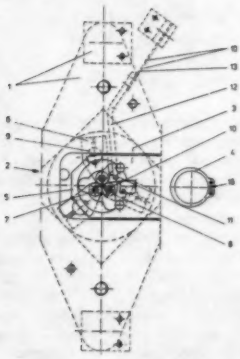
Karl Komlos, Selters, and Radu Mihalcea, Hückelhoven, both of Fed. Rep. of Germany, assignors to Seeger-Orbis GmbH, Konigstein/Taunus, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 337,951

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812741

Int. Cl.[5] B23Q *17/20*; B23P *19/04*

U.S. Cl. 29—705 **4 Claims**



1. An assembly apparatus for retaining rings, comprising a tensioning arrangement apparatus for applying controlled tension to a retaining ring and an assembly head for receiving a tensioned retaining ring and guiding it into an annular groove, said tensioning arrangement apparatus comprising

a position measuring system for determining a diameter of the tensioned retaining ring in the tensioning arrangement apparatus,

a force measuring system for determining a tension force of said retaining ring in a tensioned condition, and

projections with force transducers mounted thereon, the projections being distributed about the circumference of the tensioning arrangement apparatus, extending axially into and radially movable with said assembly head, each projection having a radial bearing mounted thereon, which presses against a corresponding tension surface of said tensioned retaining ring which is positioned against said radial bearings when the projections are in said assembly head.

4,965,927

APPARATUS FOR APPLYING SURFACE-MOUNTED ELECTRONIC COMPONENTS TO PRINTED CIRCUIT BOARDS

Eli Holzman, 2787 Parkview Dr., Thousand Oaks, Calif. 91362

Filed Sep. 21, 1989, Ser. No. 410,726

Int. Cl.[5] B23P *19/00*; B29C *33/00*

U.S. Cl. 29—740 **35 Claims**

1. A fixture for positioning a plurality of surface-mounted electronic component dispensing magazines in a printed circuit board assembling apparatus, said fixture comprising:

a plurality of upstanding hollow open-ended guides adapted for receiving said magazines, each guide being positioned in registry with the footprint on a printed circuit board of the component dispensed by its associated magazine, said guides being rigidly supported in a unitary block of elastomeric material.

35. A method for producing a fixture for positioning a plurality of surface-mounted electronic component dispensing magazines in a printed circuit board assembling apparatus, said method comprising:

fabricating a prototype printed circuit board;

temporarily supportingly affixing the lower end of an upstanding guide to said board in registry with the footprint of each surface-mounted electronic component comprising the assembled circuit;

forming a dam around the periphery of the prototype board;

covering the area within the dam surrounding the guides with a layer of liquid elastomeric material;

allowing or causing said material to harden into a rigid block; and

separating said prototype board from said block, thereby exposing the open lower ends of said guides.

4,965,928

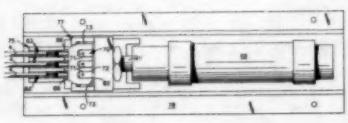
TERMINAL ASSEMBLING TOOL FOR CONNECTING MULTIPLE TERMINATED WIRES TO A CONNECTOR

Ramon M. V. Verge, Valls, Spain, assignor to Mecanismos Auxiliares Industriales, S.A., Valls, Spain

Filed Aug. 17, 1989, Ser. No. 395,372

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—742 **7 Claims**



1. A terminal assembling tool for facilitating the connection of multiple terminated wires to a common bus connector, the terminated wires each including a terminal for receiving a terminal of complementary type, and the common bus connector including multiple terminals of said complementary type extending therefrom in substantially the same direction, comprising:

a first jig for receiving said multiple terminated wires;

a second jig for receiving said common bus connector;

at least one of said first and second jigs being movable relative to the other between relative proximate and distant positions respectively corresponding with a connecting position and a load/unload position;

means for actuating said one of said first and second jigs between said connecting and said load/unload positions;

said first jig including means for pre-positioning said terminated wires; and

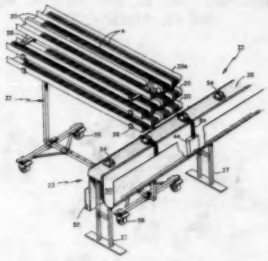
said second jig including means for pre-positioning said common bus connector, whereby upon said actuation of said one of said first and second jigs said terminated wires are accurately and completely connected to respective ones of said terminals on said common bus connector.

4,965,929

SYSTEM FOR FABRICATION OF WIRE HARNESS

Jordi C. Aligué , Reus, Spain, assignor to Mecanismos Auxiliares Industriales, S.A., Valls, Spain

Filed Aug. 17, 1989, Ser. No. 395,378
Int. Cl.[5] B23P *19/00*
U.S. Cl. 29—742 8 Claims



1. A system for the fabrication of wire harnesses each having multiple wires, comprising:

a mechanized conveyor of particular width having relative upstream and downstream portions and multiple work stations therealong for the progressive formation of said harnesses from embryonic to completed states respectively;

means proximate at least some of said work stations for providing wires, including some terminated wires, for inclusion in a wire harness, the length of at least some of said wires being substantially greater than said particular width of said conveyor; and

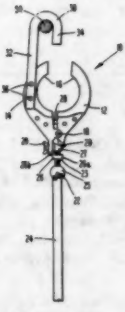
a trough adjacent at least one side of said conveyor along at least said upstream portion thereof whereby said wires of a said embryonic harness may extend transversely of the conveyor beyond its said particular width and into said trough.

4,965,930

INSULATOR INSTALLATION TOOL

Joseph T. Wnukowski, c/o Philadelphia Electric Co., 2301 Market St. , P.O. Box 8699, Philadelphia, Pa. 19101

Filed Aug. 11, 1989, Ser. No. 392,418
Int. Cl.[5] A47F *13/06*
U.S. Cl. 29—758 3 Claims



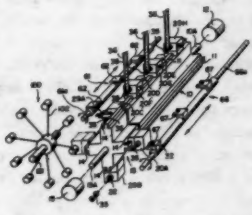
1. A hot stick mounted tool for use in installing an insulator string in an energized power line, comprising in combination (1) an electrical hot stick, (2) a tool for adjustably securely grasping an insulator disc string and maintaining the string in a position supported from an energized power line, said tool comprising in combination a pair of pivoting jaws, one jaw of said pair being stationarily mounted with respect to said hot stick, respective facing portions of said jaws being configured for grasping a series of disc insulators when said jaws are closed, hook means formed integrally with the stationarily mounted jaw and extending axially of said hot stick and sufficient distance beyond said jaws for engaging an energized power line while said jaws are in grasping relationship with the series of disc insulators, and spaced apart from said power line, and (3) means connecting said tool and hot stick whereby said pivoting jaws are adjusted to grasp said series of disc insulators by rotation of the hot stick around its longitudinal axis.

4,965,931

SYSTEM FOR WINDING FILM ON A SPOOL AND LOADING THE SPOOL WITH THE FILM INTO A MAGAZINE

Chiaki Suzuki, and Shigehisa Shimizu, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 351,236, May 15, 1989. This application Nov. 27, 1989, Ser. No. 441,740
Claims priority, application Japan, May 13, 1988, 63-116404
Int. Cl.[5] B23P *21/00*
U.S. Cl. 29—783 1 Claim



1. A system for winding a photographic roll film around a spool and loading the spool with the film into a film magazine comprising:

a plurality of film winding pallets, each having a spool holding shaft which holds a spool and rotates the spool about its longitudinal axis under a force transmitted to the spool holding shaft from outside its corresponding film winding pallet and a film pinch means which opens and closes under a force transmitted thereto from outside the film winding pallet and pinches a leader portion of a roll film when the film pinch means is closed,

a first indexing means having a plurality of guide members which are disposed about a rotational axis at regular angular intervals with respect to each other and equidistant from said rotational axis, each guide member being adapted to support n film winding pallets, n being not smaller than 2, so that the spool holding shafts of the respective film winding pallets are in alignment with each other in a direction parallel to the rotational axis and the film winding pallets are movable back and forth in a direction of the spool holding shaft,

a second indexing means having a plurality of guide members which are disposed about a rotational axis at regular angular intervals with respect to each other and equidistant from said rotational axis, the rotational axis of the second indexing means being in alignment with the rotational axis of the first indexing means and each guide member of the second indexing means being in alignment with one of the guide members of the first indexing means,

a first indexing means driving means which intermittently rotates the first indexing means at intervals of a first predetermined time T1 by an angle equal to the angular interval between two adjacent guide members of the first indexing means,

a second indexing means driving means which intermittently

rotates the second indexing means at intervals of a second predetermined time T2 by an angle equal to the angular interval between two adjacent guide members of the second indexing means and stops the second indexing means in a position where each of the guide members of the second indexing means is in alignment with one of the guide members of the first indexing means, the second predetermined time T2 being equal to one n-th of the first predetermined time T1,

a means for connecting an end of a roll film opposite to said leader portion to the spool held by each of the n film winding pallets on a guide rail of the first indexing means which is positioned in a predetermined film winding station,

a winding driving means which transmits rotational forces simultaneously to the spool holding shafts held by the respective film winding pallets in the predetermined film winding station from outside the film winding pallets st that the spools are rotated and the roll films are wound around the spools with the leader portions kept unrolled,

a film pinch means driving means which transmits forces to the film pinch means of the respective film winding pallets from outside the film winding pallets after the roll films are wound around the spools so that the film pinch means are closed and pinch the leader portions of the roll films,

a spool-film assembly feeding means for performing a spool-film assembly feeding operation which begins after the first indexing means is rotated to position a selected guide member thereof at a predetermined spool-film assembly feeding station, said assembly feeding operation comprising moving a film winding pallet located on the selected guide member along the selected guide member in the direction of a free end of the spool thereon, delivering said film winding pallet to one of the guide members of the second indexing means, thereby loading the spool on the delivered film winding pallet into a film magazine barrel plate, transmitting a force to the film pinch means so that the film pinch means opens to release the leader portion of the roll film of the spool on the delivered film winding pallet, and causing the spool holding shaft to release said spool, the spool-film assembly feeding means being arranged to perform said spool-film assembly feeding operation within the second predetermined time T2,

a spool supplying means for performing a spool supplying operation which begins after the second indexing means rotates the guide member supporting thereon the delivered film winding pallet to a predetermined spool supplying station, said supplying operation comprising feeding another spool to the spool holding shaft of said delivered film winding pallet and causing the spool holding shaft to hold said another spool, the spool supplying means being arranged to perform said spool supplying operation within the second predetermined time T2, and

a pallet returning means for performing a pallet returning operation which begins after the second indexing means rotates the guide member supporting thereon the delivered film winding pallet to a predetermined pallet returning station, said pallet returning operation comprising moving the delivered film winding pallet from the guide member of the second indexing means to a guide member of the first indexing means said pallet returning means being arranged to perform said pallet returning operation within the second predetermined time T2.

4,965,932

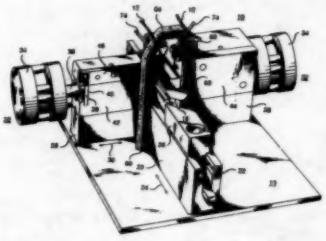
METHOD AND APPARATUS FOR ATTACHING A CONNECTOR

Kenneth H. Billingham, Feasterville, Pa.; James E. Franks, Lindenwold, N.J.; Ivan Pawlenko, Holland; Frank J. Schiller, Yardley, both of Pa., and Alexander Shemarovsky, Robbinsville, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 317,262, Feb. 27, 1989, Pat. No. 4,903,399. This application Jan. 22, 1990, Ser. No. 468,419

Int. Cl.[5] H01R *43/04*

U.S. Cl. 29—861 **2 Claims**



1. A method for attaching successive pairs of wires to successive pairs of contacts seated in opposing recesses spaced along each of a pair of parallel rows on a connector, comprising the steps of:

placing the connector on a slidably mounted carriage so that each of a pair of opposed recesses in the connector is opposite a separate one of a pair of ram assemblies which are movable to and from the connector;

manually pulling each of a pair of wires downwardly across each of a pair of upwardly inclined members, and then pulling the wires downwardly into alignment with each of the ram assemblies;

manually holding each pair of wires in tension while displacing each ram assembly towards the contact opposite thereto to ram the wire into the contact for attachment thereto;

adjustably limiting the travel of each ram assembly into the recess to control the extent to which each wire is rammed;

retracting each of the ram assemblies once each of the pairs of wires has been rammed into a separate one of the recesses; and

advancing the carriage along its axis of travel to locate each of a successive pair of recesses in the connector opposite a separate one of the ram assemblies.

4,965,933

PROCESS FOR MAKING INSERT MOLDED CIRCUIT

James E. Mraz, Lindenhurst; Martin T. Schwartz, Glenview; James M. Kemp, Libertyville; Joel M. Schotanus, Wildwood, and Donald P. Schwarz, Wheeling, all of Ill., assignors to The Cherry Corporation, Waukegan, Ill.

Filed May 22, 1989, Ser. No. 354,458

Int. Cl.[5] H01R *43/04, 43/16*

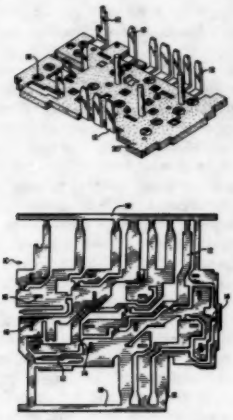
U.S. Cl. 29—882 **13 Claims**

1. A method for forming an electrical connector from a lace curtain, wherein the lace curtain includes a plurality of electrical connectors joined by at least one interconnect joint, the method comprising the steps of:

providing a mold having a cavity configured to receive the lace curtain;

inserting the lace curtain in the cavity of the mold;

while the lace curtain is in the mold, severing the interconnect joints; and



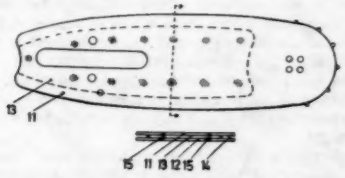
after the interconnect joints have been severed, injecting a flowable, insulating material into the mold such that the insulating material surrounds the connectors.

4,965,934

LAMINATED GUIDEBAR

Lars-Olov Eriksson, Edsbyn, and Erik Sundström, Sandviken, both of Sweden, assignors to Sandvik AB, Sandviken, Sweden

Filed Nov. 29, 1989, Ser. No. 442,703
Int. Cl.[5] B23D *57/02*
U.S. Cl. 30—387 **4 Claims**



1. A guidebar for powered saws, comprising two outer plates and a middle plate all joined together by spot welds, and forming a groove along an edge thereof for guiding a cutting element, said outer plates formed of a hardenable steel having a carbon content greater than 0.5 percent without boron, said middle plate formed of a boron alloyed steel having a carbon content less than 0.25 percent.

4,965,935

TILE CUTTING TABLE

Roger Z. Bourque, P.O. Box 6, Scoudouc EOA,1ND, Canada

Filed Jan. 5, 1989, Ser. No. 362,008
Int. Cl.[5] B24H *1/04*; B28D *1/22*
U.S. Cl. 33—26 **7 Claims**

1. A tile cutting table comprising,

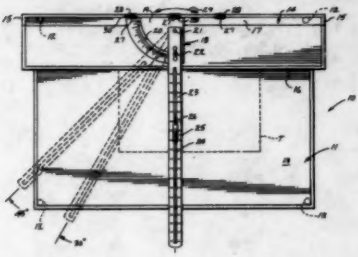
a support table including a planar top surface, an elongate rear edge spaced from a forward edge, and side edges to define the top surface, and

an abutment ledge integrally secured to and coextensively with said rear edge wherein said abutment ledge extends above the top surface defining an abutment surface oriented orthogonally to said top surface and spaced between the rear and forward edges, and

a gauge assembly including a base portion pivotally mounted onto an abutment ledge top surface spaced above the planar top surface including a plurality of first hinge segments secured to said base portion cooperative with a plurality of second hinge segments secured to a rear top edge of said abutment ledge, and

a guide rule pivotally mounted to said base portion, and

wherein the abutment ledge extends beyond each side edge of the support table, and



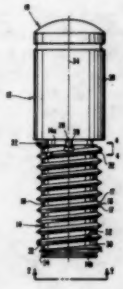
wherein a further second hinge segment is secured aligned with the plurality of second hinge segments to the rear top edge of said abutment ledge, and further including a cylindrical rod defining a length equal to a distance between the plurality of second hinge segments to selectively secure the base portion to the plurality of second hinge segments or selectively to one of said plurality of hinge segments and to the further second hinge segment upon rotation of the base portion one hundred eighty degrees relative to the rear top edge of said abutment ledge.

4,965,936

THREAD PITCH CYLINDER GAGE

Gerald K. Sentman, 831 S. Post Rd., Indianapolis, Ind. 46239

Filed Sep. 23, 1988, Ser. No. 248,433
Int. Cl.[5] G01B *3/48*
U.S. Cl. 33—199 R **15 Claims**



1. A pitch cylinder gage, comprising:

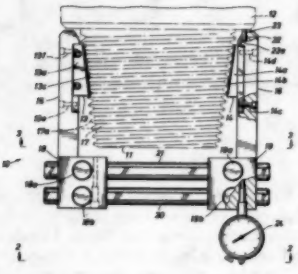
at least four means for tangentially engaging the thread grooves of a threaded feature on a workpiece;

means for retaining said tangentially engaging means, said retaining means including means for axially spacing a plurality of said tangentially engaging means and for circumferentially spacing a separate plurality of said tangentially engaging means; and

rotatable means for moving said tangentially engaging means into engagement with the thread grooves, whereby a cylinder coaxial with the pitch cylinder of the threaded

feature is spatially defined by said tangentially engaging means, said rotatable moving means including a cam element of circumferentially varying radius rotatably coupled to said retaining means, said rotatable cam element being adapted to contact said tangential engaging means and move them into engagement with the thread grooves when rotated relative to said retaining means.

4,965,937
TOOL JOINT GAUGE
Tom H. Hill, 11722 Quail Creek, Houston, Tex. 77070
Filed Sep. 30, 1988, Ser. No. 251,233
Int. Cl.[5] G01B *3/48*
U.S. Cl. 33—199 R **13 Claims**

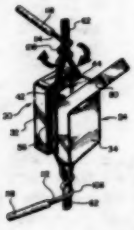


1. A gage to measure the distance from a specific pitch diameter to the shoulder face of a rotary shouldered connection having tapered threads comprising:

a. positioning means, including pads having linearly extending end faces tapered to form line contact with thread crests on said connection to position the gauge on the connection at a known place relative to said specific pitch diameter to form the effective reference for the gauge; and

b. measuring means connected with said positioning means and movable to multiple positions over said shoulder face to measure the distance from the gauge to said shoulder face at each of said multiple positions.

4,965,938
RESISTIVELY-MOUNTED, MANUALLY-POSITIONABLE PEEP SIGHT
Charles A. Saunders, Columbus, Nebr., assignor to Saunders Archery Company, Columbus, Nebr.
Filed Jan. 22, 1990, Ser. No. 467,923
Int. Cl.[5] F41G *1/467*
U.S. Cl. 33—265 **7 Claims**



1. A peep sight for mounting on a bowstring of an archery bow, said peep sight comprising,

a generally block-like body, said body including wing means joined to and angled upwardly and rearwardly, said wing means being formed with through aperture means in a target-facing portion thereof for sighting therethrough along a line essentially normally of a principal face of said wing means,

said body having a forward wall spaced from a rear wall, and an intermediate, interconnecting core interposed therebetween,

said core being recessed with respect to lateral limits of said forward and said rear wall, said forward and said rear wall defining therebetween, and with lateral walls bounding said core, opposed generally-parallel, longitudinally extending, channel-like grooves opening laterally of and opening endwise of said core,

each of said grooves being adapted to receive therein and restrictingly to retain at each of opposed corresponding said lateral walls of said core a band-like array of divided strands of a multi-stranded bowstring, said strands of each said array being trained within respective said grooves and about said core for stressed engagement therewith, said strands continuing upwardly and downwardly beyond said core and beyond said body of said peep sight,

fixture means for mounting said peep sight on the bowstring, said fixture means including mid-section wire means for engaging said body of said peep sight, said wire means being connected at upper and lower ends thereof to a convoluted, longitudinally-extending, ellipsoidal segment, each said ellipsoidal segment defining passageway means bounded by and extending within said convoluted segment for accommodating a portion of the bowstring threaded therethrough,

arm means joined to at least one said ellipsoidal segment at an end thereof and extending from said ellipsoidal segment for attachment of tether line means thereto for stabilizing and for positionally restraining said peep sight in a functionally efficaucious attitude,

an upper said elipsoidal segment of said fixture means extending from a zone displaced upwardly of said sighting aperture means of said peep sight, said core of said body of said peep sight defining at an upper end portion thereof spacer means disposed between the divided strands of the bowstring for restraining and for maintaining the divided strands in a laterally-spaced-apart configuration to establish between the divided strands a throughviewing zonal area, said zonal area being in alignment with said sighting aperture means in said wing means of said body of said peep sight to delineate a viewing vector when sighting on a target,

said peep sight together with said fixture means being forcibly manually shiftable along the bowstring, against inertial and frictional forces established between the bowstring and each said ellipsoidal segment of said fixture and said core of said body of said peep sight, said forces being operative to restrain said peep sight from casual and inadvertent and unintentional sliding movement along the bowstring,

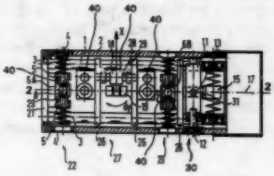
said peep sight being conveniently manually displaceable to assume selectable positions on the bowstring along the length thereof,

said bowstring-engaging ellipsoidal segments constituting means for obviating any need to apply wrapping to and to remove wrapping from the bowstring in a zone delineated by said peep sight.

4,965,939
PROGRAMMING HANDLE
Richter Hans, Augsburg, Fed. Rep. of Germany, assignor to Blomberg Robotertechnik GmbH, Ahlen, Fed. Rep. of Germany
Filed Jun. 1, 1989, Ser. No. 360,095
Claims priority, application European Pat. Off., Jun. 11, 1988, 88109325.6
Int. Cl.[5] G01B *7/28*
U.S. Cl. 33—558 **13 Claims**

1. A programming device for detecting movements of a

movable apparatus having an inner part which is rigidly connected to a part of the movable apparatus whose movements are to be programmed, a casing surrounding the inner part, coil springs disposed between the inner part and the casing, the springs enabling relative movements between inner part and the casing corresponding to directions to be programmed, sensors for measuring the relative movements and converting



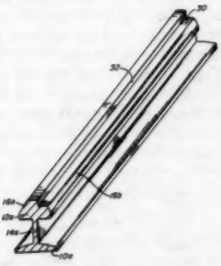
them into electrical signals, a sliding carriage connected to the casing, the sliding carriage being mounted on the inner part in such manner that it can be linearly moved in an axial direction at right angles to the longitudinal axis, one of said coil springs which can be compressed in the axial direction of the inner part being located on each side of the sliding carriage between the casing and inner part, whereby relative movement between the sliding carriage and inner part can be measured.

4,965,940

METHOD AND APPARATUS FOR ALIGNING A SAWMILL GUIDE RAIL

Harry Wilson, 143 Woodlawn Ave., Sunbury, Pa. 17801

Filed Mar. 30, 1989, Ser. No. 330,819
Int. Cl.[5] E01B *5/02, 35/00*
U.S. Cl. 33—651.1 **5 Claims**



2. A method of aligning a sawmill carriage guide rail of the type having a head portion with two beveled side surfaces upon which guide wheels of a sawmill carriage roll in a straight line of travel, comprising:

A. forming a groove into said head portion defined by two flat surfaces intersecting at a right angle and extending the length of said rail parallel to the line of travel of said guide wheels, one of said surfaces lying in a horizontal plane and the other surface lying in a vertical plane and such that said surfaces do not interfere with said guide wheels rolling on said head;

B. positioning said rail on a suitable base against which it can be attached;

C. positioning a straight-edge, having an edge and side surface, lengthwise within said groove with its side against one of said surfaces and its edge against the other said surfaces to measure the alignment of said rail in a plane parallel to the straight line of travel and

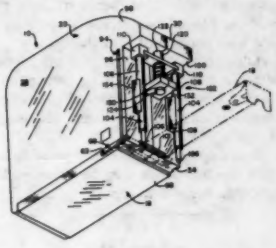
D. adjusting the rail to be in a straight line in that plane.

4,965,941

COMBINATION MARKER AND TAPE MEASURE

Frank J. Agostinacci, 10392 NE. 12th, Bellevue, Wash. 98004

Filed Nov. 29, 1989, Ser. No. 443,569
Int. Cl.[5] G01B *3/02, 3/10*
U.S. Cl. 33—668 **18 Claims**



1. A combination marker and tape measure comprising:

(a) a housing having a pair of sidewalls, a front wall, a back wall, a top wall, and a bottom wall;

(b) a flexible tape mounted inside said housing, said tape having incremental indicia thereon for measuring distances;

(c) a pair of markers mounted on said front wall, one marker being positioned adjacent to each edge of said flexible tape, said markers being mounted to move between a retracted position, wherein each of said markers is positioned above a plane of said tape, which as been extracted from within said housing and an extended position, wherein each of said markers projects below said plane of said tape to contact a surface on which said tape is placed;

(d) an actuator member mounted on a forward edge of said top wall for moving each of said markers between said retracted and extended positions;

(e) a front window cover removably mounted on said front wall to cover said pair of markers; and

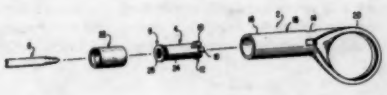
(f) a bottom cover slidably mounted on said housing to slide between a forward position, wherein said bottom cover is slid into contact with said front window cover to enclose said pair of markers, and a rearward position, wherein said bottom cover is moved out of contact with said front window cover to expose said pair of markers such that said pair of markers can move to said extended position and mark a surface upon which said tape is placed.

4,965,942

DIPSTICK HANDLE

Andrew K. Hoszowski, Greenville, Miss., assignor to Moeller Manufacturing Co., Inc., Greenville, Miss.

Filed Apr. 17, 1990, Ser. No. 509,790
Int. Cl.[5] G01F *23/04*
U.S. Cl. 33—730 **14 Claims**



1. A dipstick handle comprising:

means for gripping comprising a gripping portion and a hollow shaft, said shaft comprising a pair of slots extending through a side wall portion thereof; and

means insertable in said hollow shaft for receiving a dipstick blade, said insertable means comprising means for releasably engaging said slots in said side wall portion of said

shaft, whereby said dipstick blade may be oriented in any of at least two directions with respect to said gripping portion and said insertable means may be released from said shaft by pressure exerted through said slots on said releasably engaging means.

14. A dipstick handle comprising:

unitarily molded means for gripping comprising a finger ring and a hollow shaft molded therewith, said shaft comprising at least one pair of diametrically opposed slots through an outside wall surface of said shaft;

means insertable in said shaft for receiving a dipstick blade, said insertable means comprising two pairs of diametrically opposed tab means for releasably engaging said slots;

sealing means for engaging between said insertable means and said shaft; and

a dipstick blade engaged with said insertable means;

whereby said dipstick blade may be oriented in any of four directions with respect to a plane of said finger ring.

4,965,943

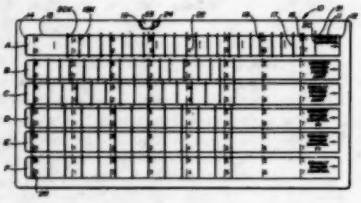
WORKPIECE JOINT-FORMING TEMPLATE SYSTEM

Phillip A. Adams, 2542 Tartan Dr., Santa Clara, Calif. 95051

Filed Sep. 8, 1989, Ser. No. 404,710

Int. Cl.[5] G01B *3/02*; B27M *3/00*

U.S. Cl. 33—758 **15 Claims**



1. In combination, a woodworking apparatus including a work surface and associated cutting tool for making predetermined cuts by said cutter tool on a first workpiece, and a template, wherein said template is removably positionable with respect to said work surface at a fixed reference position relative to a desired cutter tool cutting path, said template comprising:

an elongated strip having a fixed reference end edge extending along one end of said strip, said reference end edge being orthogonal to a longitudinal axis of said strip and being adaptable to abut said fixed reference position in parallelism;

first linear indicia means extending orthogonally to and visible on one side of said strip and being spaced from said strip fixed reference end in an amount for locating a cutting tool at a predetermined first position relative to a workpiece for executing a first cut in said workpiece; and

second and succeeding linear indicia means on said side of said strip spaced from and parallel to said first indicia means for locating a cutting tool at a predetermined second and predetermined succeeding positions relative to said workpiece for executing second and succeeding cuts in said first workpiece extending parallel to said first work cut.

4,965,944

SQUARING TAPE MEASURE CASE

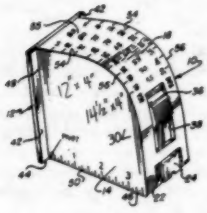
Alexander Kuze, 5412 Cassia Dr., Ft. Pierce, Fla. 34982, and Gil Mitchell, 33 Richard Rd., Manchester, Conn. 06040

Filed Oct. 10, 1989, Ser. No. 418,512

Int. Cl.[5] G01B *3/10*

U.S. Cl. 33—760 **10 Claims**

1. A casing for a tape measure, comprising a laterally spaced pair of substantially identical sidewall portions, and edge wall portions extending therebetween and cooperating therewith to define a chamber for the containment of a cooled rule, said casing being substantially symmetrical about a medial plane between said sidewall portions, each of said sidewall portions having a planar outer face bounded by two intersecting rectilinear edges and a curvilinear edge extending therebetween, said casing having an aperture through the edge wall portion circumscribing said curvilinear edges of said sidewall portions, and said casing also including a pair of marginal abutment components, each extending laterally outwardly beyond said outer face of the adjacent one of said sidewall portions along one of said rectilinear edges thereof, said components providing abutment surfaces contiguous with said faces and in a common plane perpendicular thereto, each of said components having a terminal edge element extending laterally outwardly



from the point of intersection of said rectilinear edges of said adjacent sidewall portion, said casing also having at least one angle scale thereon effectively extending along said circumscribing edge wall portion from adjacent said one rectilinear edges and including indicia thereon extending to both of said curvilinear edges, said scale being constructed to indicate angular displacement with reference to said abutment surfaces of said abutment components on arcs having center points at said points of intersections, said casing being pivotable on the associated one of said terminal edge elements when said casing is disposed with said outer face of one said sidewall portions lying upon a flat surface of a workpiece and with said terminal edge element bearing upon a perpendicular surface thereof, to permit angular measurements to be made using said angle scale and to permit scribing of the workpiece surface along the other of said rectilinear edges of said one sidewall portion.

4,965,945

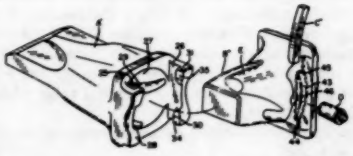
EXCAVATING TOOTH

Robert K. Emrich, Portland, Oreg., assignor to ESCO Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 155,892, Feb. 16, 1988, Pat. No. 4,811,505, which is a continuation of Ser. No. 937,982, Dec. 4, 1986, Pat. No. 4,761,900. This application Feb. 10, 1989, Ser. No. 309,309

Int. Cl.[5] E02F *9/28*

U.S. Cl. 37—142 R **12 Claims**



1. A replacement point for an excavating tooth comprising relatively elongated, unitary body having an earth engaging edge at the forward end thereof and an adapter nose-receiving socket in the rear end defined by top, bottom and a pair of side walls, at least one of said side walls extending rearwardly

beyond said top and bottom walls, each of said side walls which extend rearwardly beyond said top and bottom walls having adjacent the top and bottom thereof of vertically spaced upper and lower ear lugs aligned to receive a locking pin.

4,965,946

DISPLAY CARD OR MOUNT

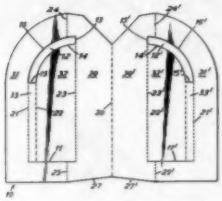
Leslie J. Hegedus, London, and Bruce Grove, Guildford, both of United Kingdom, assignors to Leslie J. Hegedus, London, United Kingdom

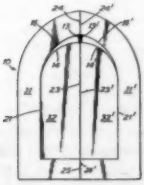
Filed May 19, 1989, Ser. No. 299,258

Claims priority, application United Kingdom, Jan. 21, 1988, 8801343

Int. Cl.[5] G09F *1/10*

U.S. Cl. 40—124.4 **10 Claims**





1. A member comprising a sheet of material for making a display card or mount comprising a central fold line extending across said sheet to its periphery, wherein there are provided a plurality of further fold lines at each side of said central fold line and parallel thereto, said further fold lines having ends spaced from the periphery of said sheet, and a plurality of cut lines extending between said ends of respective ones of said further fold lines, wherein at each side of said central fold line, said central fold line and adjacent ones of said further fold lines at each side of said central fold line define a respective spine area, said spine areas being arranged to engage each other upon folding of said central fold line, and respective areas of said sheet on opposite sides of said spine are arranged to be substantially coplanar upon folding of the remaining fold lines.

4,965,947

DEVICE FOR THE DISPLAY OF ADVERTISING MATERIAL

Franco Zanetti, Via Delle Grazie 24/A, Brescia, Italy

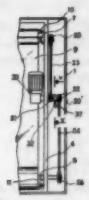
Continuation of Ser. No. 821, Jan. 6, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 224,272

Claims priority, application Italy, Jan. 7, 1986, 5101 A/86

Int. Cl.[5] G09F *11/18*

U.S. Cl. 40—471 **3 Claims**

1. A display device for advertising messages, comprising a box-shaped body having front, rear, side and end walls, a firs roller rotatively mounted in said body a second roller rotatively mounted in said body, each roller being mounted adjacent one of said end walls, a transparent screen extending across said front wall, a flexible member capable of bearing messages having respective ends engaged over an associated said roller and extending over said screen, illumination means in said body for illuminating said member and said screen, drive means in said body connected to each of said rollers for rotating said rollers in selected rotational directions so as to selectively roll and unroll said flexible member thereon said drive means including a drive motor, a drive shaft connected to said drive motor, a firs roller transmission connected to said first roller, a second roller transmission connected to said second roller and engaging means for engaging said drive shaft with one said first and second roller transmissions to drive one of said first and second rollers while another of said first and



second rollers idles, an indicator carried by said flexible member, said indicator having a position fixed with respect to a message for positioning said message, a control connected to said drive means for controlling the rolling and unrolling of said flexible member from respective said roller, including a photocell in said body positioned to scan said flexible member and sense said indicator said control means for actuating said drive means, based on the sensed position of said indicator.

4,965,948

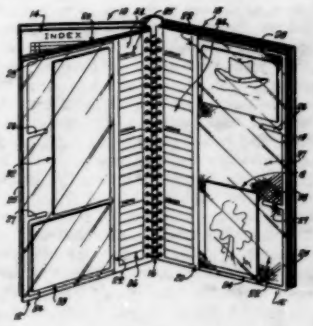
BI-DIRECTIONAL ALBUM WITH MEMO AREA

Jason I. Ruebens, Chatsworth, Calif., assignor to Pioneer Photo Albums, Inc., Chatsworth, Calif.

Filed May 14, 1984, Ser. No. 609,633

Int. Cl.[5] G09F *19/00*

U.S. Cl. 40—537 **9 Claims**



1. An album for storage of photographs or the like having a maximum first dimension and a maximum second dimension shorter than the maximum first dimension, said album comprising:

at least two bound leaves forming pages for mounting photographs or the like; and

at least two transparent covers individually attached to separate leaf pages, wherein each transparent cover is attached to a page along a top edge, a bottom edge and a first side edge of said transparent cover and further attached to the page along at least two attachment lines extending from said first side edge toward an opposite unattached second side edge, said attachment lines running parallel to said top and bottom edges, the end of each

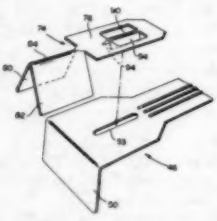
attachment line furthest from the attached first edge being a free end, wherein with respect to each attachment line the distance from the unattached second side edge to the free end of the attachment line is at least equal to said maximum second dimension, and wherein the distance between adjacent attachment lines and between the top or bottom edge and adjacent attachment line is the maximum second dimension, whereby a photograph or the like can be inserted horizontally between an attachment line and the adjacent top or bottom edge, or between two adjacent attachment lines, but cannot be inserted therebetween in a vertical orientation, and whereby a photograph or the like can be inserted vertically between the free end of an attachment line and said unattached second side edge, said attachment line preventing rotation of the photograph or the like so vertically mounted.

4,965,949

LABEL HOLDER ATTACHMENTS FOR PRODUCT INFORMATION DISPLAY TAGS

Jacob Fast, and Robert Fast, both of 7561 NW. 9th St., Plantation, Fla. 33317

Filed May 3, 1989, Ser. No. 346,698
Int. Cl.[5] G09F *3/00*
U.S. Cl. 40—642 **16 Claims**



1. A label holder attachment for use with an elongate product information display tag of the kind having a proximal end mounting portion for securing the tag at the proximal end of a generally horizontally extending product support hook, an elongate body portion for extending over the length of the hook to present product information at a distal end thereof, and an elongate slot formed toward the distal end of the body portion, the label holder attachment comprising a mounting portion and a label holder portion, the mounting portion including a substantially planar mounting panel with a longitudinal fold line and pairs of laterally outwardly extending cuts at opposite ends of the longitudinal fold line defining a pair of fold-down tabs extending in opposite directions from the longitudinal fold line, the tabs when squeezed together being insertable in said slot from above to mount the attachment on the tag, the mounting panel being dimensioned to locate the label holder portion at the distal end of said body portion and the label holder portion including means for attaching a label thereto.

4,965,950

DISPLAY DEVICE FOR AUTOMOTIVE MARK PLATE

Atsushi Yamada, Shizuoka, Japan, assignor to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,722
Claims priority, application Japan, Mar. 23, 1987, 62-40821[U]; Jul. 7, 1987, 62-103350[U]; Sep. 18, 1987, 62-141662[U]; Sep. 18, 1987, 62-232503; Feb. 12, 1988, 63-28920
Int. Cl.[5] G09F *13/18*
U.S. Cl. 40—546 **7 Claims**

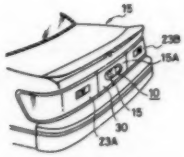
1. An automobile lighting device for use in a vehicle having a pair of tail lamps at a rear side thereof comprising:

a decorative plate having an opening, said decorative plate adapted to be positioned between a pair of tail lamps of the vehicle whereby, said decorative plate is so arranged as to form a horizontally linear appearance with the pair of tail lamps;

a case having an opening on the front side thereof, said case being positioned at a rear side of said decorative plate;

a display panel having a display region, said display panel being coupled to said case in such a manner as to cover said front opening of said case, a part of said display panel being fitted in said opening of said decorative plate;

a light conducting member arranged on a rear surface of said display panel, said light conducting member having at least one light incident part and a plurality of conically shaped stipples formed in a rear surface thereof in such a



manner that said stipples increase in density from a position where said light incident part is located, said rear surface having flat areas between said stipples for reflecting light incident onto said flat areas towards the front surface of said light conducting member, whereby all regions on the front surface of said light conducting member are uniform in the amount of illumination per unit area; and

lighting means arranged in said position of said light incident part,

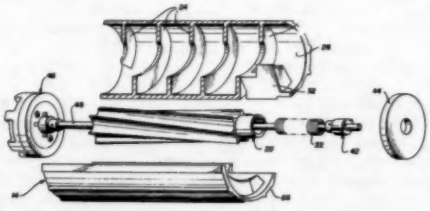
the rear surface of said light conducting member being linearly inclined with respect to said rear surface of said display panel.

4,965,951

LARGE CAPACITY AMMUNITION MAGAZINE

Michael K. Miller, and Warren D. Stockton, both of 405 E. 19th St., Bakersfield, Calif. 93305

Division of Ser. No. 260,052, Oct. 20, 1988, Pat. No. 4,888,898.
This application Aug. 11, 1989, Ser. No. 396,211
Int. Cl.[5] F41C *25/10*; F41D *10/12, 10/24*
U.S. Cl. 42—49.01 **3 Claims**



1. An ammunition magazine for a gun, said magazine being of an elongated, generally cylindrical configuration, said magazine comprising an outer housing, a drive member for ammu-

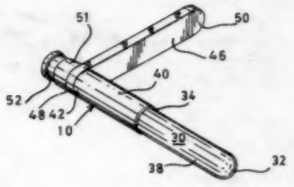
nition cartridges rotatably mounted within said outer housing, a drive spring strong enough to rotate said drive member within said housing even when said magazine is filled with cartridges, said drive spring comprising a helical torsion spring having a length less than the length of said magazine, means to prevent overwinding and kinking of said drive spring, said preventing means comprising rod means extending through the center of said torsion spring, and said rod means having a length substantially equal to the length of said magazine, manual winder means for said spring, means to fix one end of said rod to said spring, said magazine including manual clutch means to permit release of the energy stored in said spring, and said rod means and said magazine including means to permit operation of said manual clutch means only when said magazine is not mounted on a cooperating gun.

4,965,952

SAFETY PLUG FOR THE FIRING CHAMBER OF A WEAPON

Gary L. Miller, 5019 O'Barr Rd., Knoxville, Tenn. 37914, and Robert G. Plummer, 1088 Lovell View Dr., Concord, Tenn. 37922

Filed Jul. 6, 1989, Ser. No. 376,292
Int. Cl.[5] F14A *17/44*
U.S. Cl. 42—70.01 **8 Claims**



1. A safety plug for the firing chamber of a weapon comprising:

a cylindrical body having a diameter less than the firing chamber bore, and having a front end and a rear end, said rear end of said body defining an internally threaded opening;

a tab mounted proximate said rear end of said body for extending from a closed firing chamber for visually indicating the weapon firing chamber is free of live ammunition, said tab having a first end portion for engaging said rear end portion of said body, said first end portion defining a bore therethrough to facilitate mounting of said tab on said body; and

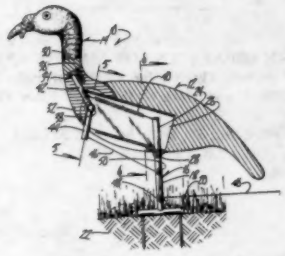
a button mounted proximate said rear end of said body and fabricated from a substantially rigid material, said button being engagable by a bolt-carrier and ejector of a standard semi-automatic weapon for injecting and ejecting the plug into and from, respectively, the firing chamber in normal weapon operation, said button including a forward end portion having a reduced diameter and externally threaded for being received by said internally threaded opening of said body, whereby said externally threaded portion of said button extends through said bore of said tab and into said internally threaded opening of said body such that said tab is sandwiched between said button and said rear end of said body when said button is threadably mounted upon said rear end of said body.

4,965,953

REMOTE CONTROLLED TURKEY DECOY

Richard H. McKinney, R.R. 1, Box 385, Denver, Iowa 50622

Filed Jul. 10, 1989, Ser. No. 377,107
Int. Cl.[5] A01M *31/06*
U.S. Cl. 43—2 **16 Claims**



1. A remote controlled fowl decoy comprising,

a fowl decoy on a support stand,

said decoy having a body member pivotally connected to said support stand, and a head and neck member pivotally connected to said body member,

a spring means operatively connected between said support stand and said body member and head and neck member,

a remote controlled control line operatively connected to said body member and said head and neck member whereby a pull on said line causes said body member to pivot relative to said support stand and said head and neck member to pivot relative to said body member, and

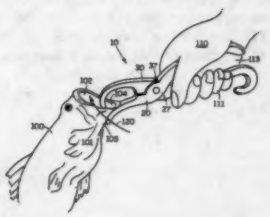
said body member having a chamber and said support stand extending into said chamber; said body member being pivoted to said support stand intermediate its ends at a point below its top end and said spring means being connected to the top end of said support stand above the pivot point and in said chamber.

4,965,954

FISH GRIPPING APPARATUS

Danny F. Cavazos, 3342 Lasses, San Antonio, Tex. 78223

Continuation-in-part of Ser. No. 245,119, Sep. 16, 1988, abandoned. This application May 24, 1989, Ser. No. 356,774
Int. Cl.[5] B25B *7/02*
U.S. Cl. 43—4 **3 Claims**



1. Fish handling pliers for gripping the lower lip of a fish while minimizing injury to the fish, comprising:

a first jaw and a second jaw, each of said first jaw and said second jaw having an engaging surface for engaging the lower lip of a fish therebetween, the engaging surface of said second jaw being transversely convex and rounded near its tip and having the shape of an inverted spoon;

means for closing said first jaw toward said second jaw to

grip the lower lip of a fish in a manner such that the flesh central to the mandible of said fish is compressed without injuring the opposite sides of the mandible, the end of said first jaw being perpendicularly positioned relative to the engaging surface of said second jaw; and

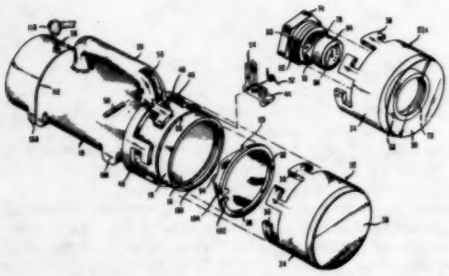
means for limiting the closure of said first jaw towards said second jaw for minimizing the minimize injury to the flesh central to the mandible of said fish.

4,965,955

CAPTURE APPARATUS FOR MARINE ANIMALS

Robert M. Campbell, 4397 Golfers Clr. West, Palm Beach Gardens, Fla. 33410, and Mark G. Duer, 225 River Ter., Jupiter, Fla. 33469

Filed Jul. 31, 1989, Ser. No. 387,232
Int. Cl.[5] A01K 63/02
U.S. Cl. 43—4 26 Claims



1. A capture apparatus for taking fish and other marine animals from a depth in a body of water, comprising:

a rigid container having an open interior pressure chamber and at least one access opening;

closure means for closing said access opening; and,

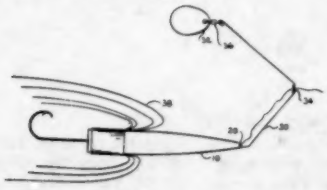
means for gradually releasing fluid from said pressure chamber, whereby said marine animals can be secured within said rigid container by said closure means, and transported to the surface of the water or to a different pressure environment, at substantially constant fluid pressure within said capture apparatus, and whereby said fluid pressure within said container can be gradually released to permit said marine animal to become adjusted to the pressure differential.

4,965,956

CAM ACTION FISHING SINKER DEVICE

Bob J. Bethel, 308 Triangle Ranch Rd., Trinidad, Tex. 75163

Continuation-in-part of Ser. No. 114,513, Oct. 30, 1987, Pat. No. 4,837,966. This application May 8, 1989, Ser. No. 349,105
The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.
Int. Cl.[5] A01K 95/00
U.S. Cl. 43—43.1 19 Claims



11. A fishing sinker device comprising

an elongate body having a longitudinal axis and first and second ends, said body qradually increasing in cross-sectional dimension from a joint at the first end thereof toward the second end thereof;

a hook aperture extending into the interior of said body from the second end thereof in coaxial alignment with the longitudinal axis of said body;

an elongate aperture penetrating said body along the longitudinal axis thereof from said first end of said body to said second end, connecting with said hook aperture in coaxial alignment therewith to form a continuous passageway through said body to receive a fishing line therethrough; and

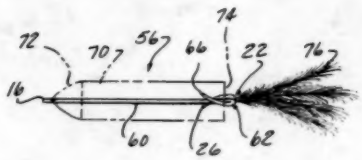
a resilient insert disposed within said hook aperture and firmly interconnected to said body within said hook aperture, said insert having a hook-retaining aperture extending into the interior thereof from the end of said insert nearest the second end of said body and penetrating said insert to connect with said elongate aperture in coaxial alignment therewith.

4,965,957

TANDEM DOUBLE OFFSET FISHHOOK

Thomas A. Hnizdor, 9164 Brady, Redford, Mich. 48239

Continuation-in-part of Ser. No. 310,965, Feb. 16, 1989, Pat. No. 4,914,852. This application Jan. 12, 1990, Ser. No. 464,157
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.
Int. Cl.[5] A01K 83/00
U.S. Cl. 43—44.82 6 Claims



1. A fishhook comprising:

an eye;

a first hook including a first shank having a predetermined length extending from and connected to the eye;

a second hook including a second shank having a predetermined length equal to the length of the first hook extending from and connected to the eye;

the shanks of the first and second hooks disposed side-by-side in parallel;

a first offset bottom curved bend formed in the first hook and terminating in a first hook point; the first offset bend curving concavely from a first plane formed by the first and second shanks, the curving forming a second plane at an angle to the first plane and causing the bottom curved bend of the first offset bend to be on one side of the first plane and the first hook point to be on the opposite side of the first plane;

a second offset bottom curved bend formed in the second hook and terminating in a second hook point, the second offset bend curving concavely from the first plane, the curving of the second offset bend forming a third plane at an angle to the first plane symmetrically opposite to the second plane relative to the first plane and causing an opposite planar effect with the first offset bend, wherein the bottom curved bend of the second offset bend is on one side of the first plane and the second hook point is on an opposite side of the first plane;

the angles of the second and third planes formed by the bottom curved bends of the first and second hooks relative to the first plane being equal; and

a gap space between the first hook point and the first shank

being equal to a gap space between the second hook point and the second shank.

4,965,958

FISH HOLDER

Steven D. Cedergreen, Seattle; Ray Aspiri, Vashon; Kim R. Hunter, Kent, and Butkui Chiu, Seattle, all of Wash., assignors to Tempress, Inc., Seattle, Wash.

Filed Jun. 29, 1989, Ser. No. 373,875
Int. Cl.[5] B25B 7/02
U.S. Cl. 43—55 **6 Claims**

1. A device for grasping a fish comprising:

a handle adapted for grasping by a human hand, said handle having a lower jaw arm extending transversely from the upper portion thereof, said lower jaw arm having an upward facing jaw face, said handle being hollow and having a vertical opening extending downwardly along the front side thereof from said lower jaw arm to a location adjacent but spaced from the lower end of said handle, said lower jaw arm having a upward opening at its rearward end,

a trigger mounted for pivotal movement inside said handle, said trigger being pivoted generally at the intersection of said handle and said lower jaw arm, said trigger having a front edge extending out of the vertical opening of said handle, said front edge being sufficiently long to be grasped by three fingers of a human hand, the little finger of said hand being positioned below said front edge and grasping the lower portion of said handle, said trigger extending upwardly through said upward opening from within said handle and terminating in a forwardly extending upper jaw arm overlying said lower jaw arm and having an upper jaw face complimentary to said lower jaw face,

stop means associated with said trigger and said handle to limit the forward pivotal motion of said trigger, and

means for biasing said trigger toward said stop means.

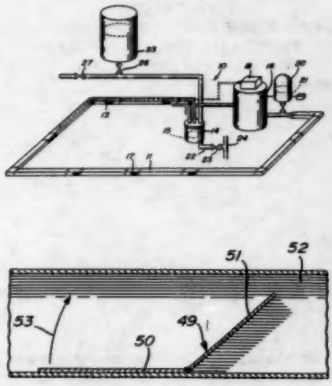
4,965,959

PEST TRAPPING AND EXTERMINATION SYSTEM

Albert P. Gagné, P.O. Box 941, Brownsburg, Quebec, Canada (J0V 1A0)

Filed Jun. 19, 1989, Ser. No. 367,933
Int. Cl.[5] A01M 23/16, 23/18
U.S. Cl. 43—61 **14 Claims**

1. An automatic pest trapping and extermination system to capture and destroy pests, said system comprising an elongated enclosed conduit member having attachment means for securing same against a wall in an area where pests are to be trapped, directing means secured to said conduit member for directing pests entering said conduit in a predetermined direction, one or more entrances in said conduit for access to the interior thereof, detection means for sensing the presence of one or more pests within said conduit, closure means to cut off access to said entrances, extermination means associated with said conduit to destroy said pest trapped therein, and control circuit means for closing said entrance closing means and actuating said directing means upon actuation of said detection means, said directing means being a vacuum pump secured to said conduit for aspirating or inducing said pests to move toward said extermination means, a timer to periodically actuate said pump and direct said pests in said conduit toward said extermination means, said extermination means having a discharge outlet to evacuate the contents of pests destroyed therein automatically after said extermination means has completed its cycle, said discharge outlet being connected to a drain pipe,



said directing means being comprised of one or more inner trap doors secured inside said conduit member, said trap doors having an opening therein to attract said pests to a trap door actuating location to permit said pests to proceed beyond said trap door in a single direction, said trap door having a floor flap section hinged on a hinge pin to a door section, said floor flap section being heavier than said door section to bias said door section to a closed operating position when there is no force acting on one side of said door section.

4,965,960

METHODS AND DEVICES FOR USING POROUS MATERIALS IN THE CONTROLLED FEEDING, DISTRIBUTION, AND APPLICATION OF LIQUID AGRICULTURAL CHEMICALS

James E. Moore, 555 Riviera Dr., Naples, Fla. 33940

Filed Apr. 26, 1988, Ser. No. 186,246
Int. Cl.[5] A01M 21/00
U.S. Cl. 47—1.5 **30 Claims**

1. An apparatus for applying liquid to vegetation comprising an applicator block consisting of a porous material defining at least a portion of a contiguous liquid distribution channel, a source of said liquid connected to said applicator block for supplying said liquid to said distribution channel, and a structural member to which said applicator block is mounted for enabling an operator to place said applicator block in contact with said vegetation, so that said liquid may flow from said source to said distribution channel and then uniformly through

the pores of said porous material to a surface in wiping contact with said vegetation, and wherein said porous material is sufficiently rigid and dimensionally-stable that it can be cut, sawed, drilled, tapped and threaded using ordinary metal working tools.

4,965,961

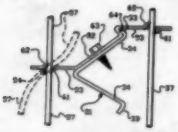
TRELLIS WIRE SUPPORT CLIP AND METHOD OF ADAPTING METAL GRAPE STAKE FOR VERTICAL TRELLISING

Harry C. Broyles, 6840 Oak La., Placerville, Calif. 95667

Filed Feb. 21, 1989, Ser. No. 312,466

Int. Cl.[5] A01Q *17/06*

U.S. Cl. 47—46 **8 Claims**



1. A trellis wire support clip for mounting on a side of a stake having a vertically extending stake shoulder means, said support clip comprising:

a one-piece clip body having a securement portion formed for mounting to said stake from a side thereof and formed to extend around said stake by an amount less than the entire periphery of said stake, said body further having a trellis wire support portion,

said trellis wire support portion being formed for support of a trellis wire thereon in spaced relation to said securement portion, and

said securement portion being formed for receipt of fastening means therethrough, and said securement portion having a vertically extending clip shoulder means shaped to cooperatively engage without penetrating said stake shoulder means when mounted thereto for interengagement of said clip shoulder means and said stake shoulder means in a manner cooperating with said fastening means to prevent rotation of said clip about a horizontal axis relative to said stake for cantilevered support of the trellis wire on said support portion relative to said side of said stake.

4,965,962

HYDROPONIC CULTURE SYSTEM

Shizuka Akagi, Chiba, Japan, assignor to Q. P. Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 49,697, May 13, 1987. This application Aug. 9, 1989, Ser. No. 391,679

Claims priority, application Japan, Nov. 21, 1984, 59-244664; Jun. 7, 1985, 60-122752; May 21, 1986, 61-114742; Jun. 12, 1986, 61-124330; Oct. 30, 1986, 61-257014; Nov. 21, 1986, 61-276720; Dec. 12, 1986, 61-282025

Int. Cl.[5] A01G *31/02*

U.S. Cl. 47—65 **28 Claims**

11. A hydroponic culture system comprising:

a plurality of angle panels disposed in a plurality of rows, each row having individual angle panels disposed in series,

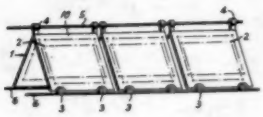
transport means for transporting each of said individual angle panels in a longitudinal direction, said transport means having an upper portion for supporting the upper end of said angle panel and a lower portion for supporting the lower end of said angle panel, said transport means allowing individual movement of said angle panels,

each of said individual angle panels arranged to be detachably removed from the transport means which carry it,

each of said individual panels having a plurality of holes for supporting plants with their roots projecting through the bottom of said holes,

feeding means comprising;

spraying means for supplying a hydroponic solution onto the roots of said plants, and



pumping means, connected to said spraying means, for supplying said hydroponic solution to said spraying means,

said spraying means being movable in said longitudinal direction, and

driving means, connected to said feeding means, for moving said feeding means in said longitudinal direction.

4,965,963

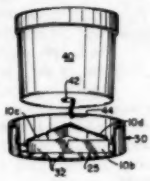
PLATFORM AND WATERING SYSTEM FOR PLANTS

William Lyon, Westbury, N.Y., assignor to Plant-Tech Horticultural Products, Inc., Mineola, N.Y.

Filed Mar. 23, 1988, Ser. No. 172,076

Int. Cl.[5] A01G *25/00*

U.S. Cl. 47—81 **11 Claims**



1. A plant watering system comprising:

a container having bottom and side walls for holding water,

free standing support means for a plant pot, said support means formed by an elongated strip of water impervious material which is foldable into a plurality of panels, means self-container within said strip for interlocking the panels without the use of any additional fasteners to expose upper and lower sets of panel edges to form a support module having an open center section upon resting said lower set of panel edges on the bottom of the container and the plant pot on the upper set of panel edges,

and a capillary wick for extending into the soil of the plant pot and through the open center sections of the support module into the container to supply water by capillary action from the reservoir to the plant pot soil.

4,965,964

PORTABLE APPARATUS FOR PROCESSING MARBLE TILE

John Di Camillo, Starr Ridge Rd., Brewster, N.Y. 10509

Filed Jan. 17, 1989, Ser. No. 297,647

Int. Cl.[5] B24B *9/06, 7/22*

U.S. Cl. 51—47 **1 Claim**

1. A portable apparatus for processing tile in situ comprising:

a. a base;

b. a singular vertical support arm consisting of a lower end fixedly connected to said base, a central portion extending upward from said base and an upper end;

c. a singular horizontal arm consisting of a proximal end, a central portion and a distal end, said arm being solely supported at said proximal end to said vertical support arm;

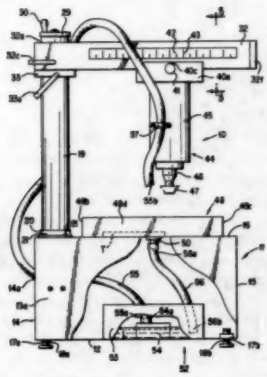
d. means for supporting said arms for moving said horizontal arm from and to selected vertical positions;

e. pivot means connecting said vertical and horizontal arms for pivotal movement of said horizontal arm about the axis of said vertical support arm in horizontal planes;

f. means locking and releasing said horizontal arm in and from selected pivoted positions about the axis of said vertical support arm;

g. rotatable means slidably mounted along said horizontal arm for drilling and shaping said tile;

h. securing means to secure said rotatable means selectively along said horizontal arm;



i. holder means fixedly connected to said rotatable means for releasably holding means for shaping tile, said holder means being rotatable with said rotatable means;

j. tray means secured on said base for positioning and guiding said tile, said tray means comprising a flat horizontal bottom panel connected to said base, a pair of opposing end walls extending from forward and rearward edges of said bottom panel, a pair of opposing side walls removably connected to said tray at side edges of said bottom panel so as to constitute said tray as means for accommodating tiles extending past a side edge of said bottom panel of said tray;

k. indicia means on said bottom panel for referencing the positioning and guiding of tiles in relation to said indicia means and to said rotatable means;

l. means mounted adjacent said rotatable means for supplying a cooling and lubricating liquid to the tool means including a flexible conduit to permit movement of said liquid supply means with said rotatable means; and

m. said bottom panel of said tray having drain means for discharging liquid therefrom.

4,965,965

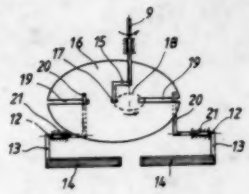
GRINDING HEAD FOR SURFACING AND POLISHING STONE, MARBLES AND OTHER HARD MATERIALS

Sven E. Wallin, P.O. Box 9, Älmhult, Sweden (S-343 00), and Anders Wallin, Bohusvägen 8, Lund, Sweden (S-222 25)

Continuation of Ser. No. 216,816, Jul. 8, 1988, abandoned. This application Jun. 27, 1989, Ser. No. 372,124

Int. Cl.[5] B24B 7/22

U.S. Cl. 51—55 **12 Claims**



1. Grinding head for surfacing or polishing stone, marbles and other hard materials, comprising:

a housing having a central main drive shaft, by means of which said housing is being rotated,

a number of shafts extending radially into said housing and rotatably mounted therein, each shaft being rigidly attached to a downward depending arm provided with a grinding block at the end thereof,

an eccentric mechanism mounted in said housing, said eccentric mechanism comprising a circular eccentric disk eccentrically attached to a second shaft extending into the housing concentrically with said main drive shaft, and a second disk rotatably mounted on said circular excenter disk for relative rotational movement between said disks about the central axis of said circular eccentric disk,

rigid connection means attached to each one of said radially extending shafts and cooperatively engaging said eccentric mechanism or imparting a swinging movement to each of said arms provided with grinding blocks, upon relative rotational movement between said main drive shaft and said second shaft,

said second disk being provided with a number of radially extending guiding channels corresponding to the number of shafts extending radially into said housing, said guiding channels slidably receiving said rigid connection means,

said second disk being prevented from rotating with respect to said housing upon relative rotational movement between said main drive shaft and said second shaft.

4,965,966

GRINDING TOOL BODY

Gerd Brassch, Sassenberg 31, 4475 Sogel, Fed. Rep. of Germany

Filed Dec. 12, 1988, Ser. No. 283,530

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742038

Int. Cl.[5] B24B 55/06

U.S. Cl. 51—273 **15 Claims**

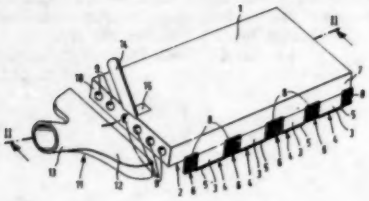
1. A grinding tool body for grinding surfaces, in particular, wood surfaces, connectable to a suction system, the grinding tool body having a working surface thereon, the grinding body comprising:

a support part moveable with respect to the surface to be ground having a first surface and an outer edge;

a plurality of suction ducts extending through said support part and ending in an inlet opening on said first surface of said support part, said first surface recessed within said support part with respect to a second surface with grinding material thereon, said second surface forming the working surface of the grinding body; and

a plurality of spaced apart blocks attached to said first surface, said blocks each having an exposed top side thereof

forming said second surface, and said exposed top side having rough grinding profile, and said blocks including bores extending between an associated suction duct and



the exposed top side of each block, said bores holding sheet-like grinding material onto said second surface by suction.

4,965,967

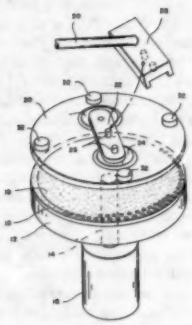
APPARATUS FOR LOW STRESS POLISHING OF SPHERICAL OBJECTS

Christopher L. London, San Jose, Calif., assignor to Watkins-Johnson Company, Palo Alto, Calif.

Filed Dec. 22, 1989, Ser. No. 455,182

Int. Cl.[5] B24B *1/00*

U.S. Cl. 51—289 S **15 Claims**



1. Apparatus for polishing spherical objects comprising

a first plate having a smooth surface,

drive means for rotating said first plate,

a second plate having a smooth surface,

support means for stationarily supporting said second plate adjacent to said first plate with said smooth surfaces facing each other, and

magnet means positioned on said second plate for limiting the travel of particles between said first plate and said second plate during a polishing operation.

4,965,968

BLAST CLEANING

Thomas W. Kelsall, Bradford, England, assignor to Kue Engineering Limited, Bradford, England

Continuation of Ser. No. 942,416, Oct. 31, 1986, abandoned. This application Aug. 1, 1989, Ser. No. 390,498

Claims priority, application United Kingdom, Mar. 2, 1985, 8505429

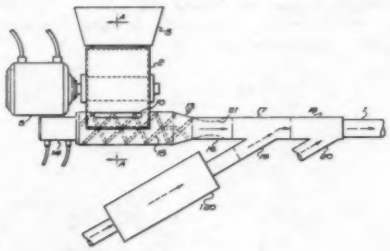
Int. Cl.[5] B24C *3/00*

U.S. Cl. 51—410 **9 Claims**

2. Apparatus for removal of contaminants from a surface with particles of ice carried in a fluid stream, comprising:

means for producing particles of frozen water,

transfer means arranged immediately below the means for producing particles of frozen water, said transfer means comprising a fixed cylindrical shell having an inner surface, and a rotor arranged for rotation within the fixed cylindrical shell, the rotor having a plurality of radial vanes extending to and sealingly engaging the inner surface of the shell so that neighboring vanes define with a portion of the shell a sealed compartment which moves with the rotor from an upper position to a lower position, and the shell having an upper opening at said upper position and immediately below the means for producing particles of frozen water so that said particles of frozen water fall from said means for producing directly into successive compartments at said upper position, and a



lower opening at said lower position which provides that said particles of frozen water fall from each successive compartment at said lower position,

auger means having an inlet portion positioned directly below said lower opening in said shell for receiving said particles of frozen water form said lower opening in said shell, and an outlet portion end to which said particles of frozen water are conveyed by said auger means,

a chamber into which the outlet portion of the auger opens;

a fluid inlet adjacent the outlet portion of the auger and leading to said chamber; and

means for supplying fluid at high pressure through said fluid inlet to said chamber to carry the particles of frozen water through the chamber to a nozzle located remotely of said outlet portion of the auger.

4,965,969

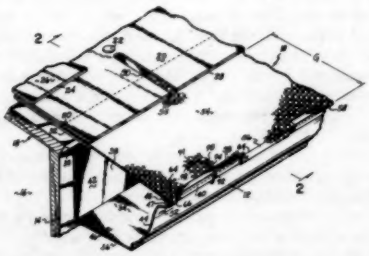
GUTTER GUARD

Dan E. Antenen, 1391 New London Rd., Hamilton, Ohio 45013

Filed Mar. 13, 1989, Ser. No. 323,363

Int. Cl.[5] E04D *13/00*

U.S. Cl. 52—12 **22 Claims**



1. A gutter guard for covering a gutter, wherein the gutter underlies the lower ends of the lowermost course of shingles of

a sloped roof and has an inwardly projecting lower lip, said guard comprising:

a flexible, deformable strip formed of a single piece of lattice-like material and having an upper edge and a lower edge;

the upper edge of said strip being adapted for insertion beneath the lower ends of the lowermost course of shingles;

the lower edge of said strip being spaced from said upper edge a distance greater than the width of the gutter such that the lower edge of the strip, when the upper edge thereof is inserted beneath the lowermost course of the shingles, at least partially overlies the inwardly projecting lip of the gutter when said strip is installed thereon;

a plurality of tabs formed integrally in said lattice-like material and spaced from each other along the length of said strip, each of said tabs having a free lower end spaced from said upper and lower edges of said strip and positioned on said strip to overlie the lip of the gutter when said upper edge of said strip is so inserted beneath the lowermost course of shingles; and

the tabs being manually deformable from a position overlying the lip of the gutter to a position below the underside of the lip of the gutter when said strip is so installed such that said lower edge of said strip and said tabs cooperate to engage the gutter lip respectfully from above and below to secure the lower edge of said strip to said gutter and to prevent the upper edge of said strip from sliding outwardly from beneath the lowermost course of shingles.

4,965,970

PREFABRICATED DOME-SHAPED STRUCTURE

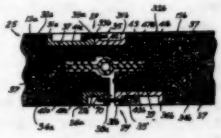
Daniela Nania, Marsala, Italy, assignor to Dynatherm Systems U.S.A. Ltd., Portsmouth, Va.

Filed Oct. 25, 1988, Ser. No. 262,901

Claims priority, application Italy, Jan. 19, 1988, 2467/88[U]

Int. Cl.[5] E04B *1/32*

U.S. Cl. 52—82 **14 Claims**



1. A pre-fabricated modular building assembly comprising:

a plurality of contoured panels, each of said panels having a pair of side edges and an arcuate bottom edge;

means for connecting one of said side edges of one of the panels to one of said side edges of an adjacent panel;

a flexible support member disposed between adjacent panels when said edges of said adjacent panels are coupled together;

wherein said edges of adjacent panels define a channel therebetween when said edges are coupled together for retaining said support members;

wherein said flexible support member is sized and shaped to be compressed within said channel providing a seal between adjacent panels when said edges of said adjacent panels are connected by said connecting means; and

wherein said support member includes a tubular portion disposed within said channel.

4,965,971

ROOF MOUNTING

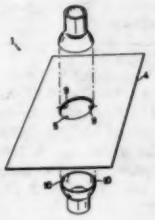
Leonard Jean-Jacques, P.O. Box 552, Rivonia, Transvaal, South Africa (2128), and John N. Sutherland, Edenvale, South Africa, assignors to Leonard Jean-Jacques, Sandton, South Africa

Filed Oct. 1, 1987, Ser. No. 103,198

Claims priority, application South Africa, Oct. 2, 1986, 86/7532; Jun. 18, 1987, 87/4392

Int. Cl.[5] E04D *13/14*

U.S. Cl. 52—199 **10 Claims**



1. A roof mounting for use in giving a rise pipe access through a roof comprising a plate having a circular hole therein, a connector embodying a spherical formation which fits closely in the circular hole in the plate, the connector having a passage therethrough and being shaped to receive the rise pipe, and, mounting means for mounting the connector to the plate in a manner permitting the connector to be pivotted relative to the plate, the roof mounting in an operative position being located with the plate parallel to the pitch of the roof and with the connector aligned with the rise pipe.

4,965,972

COMBINED DECK UNIT AND CELLULAR RACEWAY

Charles N. Domigan, Coolville, Ohio, and J. David Harmon, Vienna, W. Va., assignors to Butler Manufacturing Company, Kansas City, Mo.

Continuation of Ser. No. 216,235, Jul. 7, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,245

Int. Cl.[5] E04F *17/08*

U.S. Cl. 52—221 **8 Claims**

1. An elongated, combined deck and multicell cellular raceway unit, the unit to extend horizontally when in use:

the deck being formed by:

(a) at least first and second parallel extending crests, each crest having a op member and a pair of webs respectively connected to opposite edges of the top member, the top member having a pair of communication cell openings and a power cell opening therebetween; and

(b) a valley between the first and second crests, the valley being formed as by the facing webs of the first and second crests and by a bottom member connected to the facing webs; and

(c) at least a partial valley formed by the other web of said first crest and by a bottom member connected to the other web;

the cellular raceway being underneath the deck and formed by:

(d) side edges, each side edge formed into a configuration constituting a side lap.

(e) a hat-shaped member including a top wall with a power cell opening and disposed on the underside and in engagement with the top of the first crest with the power cell opening in the top wall being in alignment with the power cell opening in the top member and the hat-shaped member also having first and second side walls connected to opposite sides of the top wall and extending toward and connected to said base member;

(f) the base and the hat-shaped member forming a power cell; and

(g) the base, the side walls of the hat-shaped member, the webs of the crest and the top member forming a pair of communication cell disposed respectively on opposite sides of the power cell.

4,965,973

DEVICES FOR LOAD CARRYING STRUCTURES

Arne Engebretsen, 3515 Kroderen, Norway

Continuation-in-part of Ser. No. 845,128, Feb. 4, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 178,313

Claims priority, application Norway, Jun. 22, 1984, 842533

Int. Cl.[5] E04C *3/26*

U.S. Cl. 52—223 R **26 Claims**

1. In a device for load carrying structures comprising a prestressed reinforced beam of laminated wood having a longitudinal axis, the improvement comprising said reinforced laminated wood beam having a curved convex tension side and a curved concave compression side in its unloaded condition, the reinforcement of said beam comprising a longitudinally extending reinforcing element having a strength greater than wood and being fixed only to said curved convex tension side of said beam so that the longitudinal axes of said reinforcing element and said beam are parallel to one another.

4,965,974

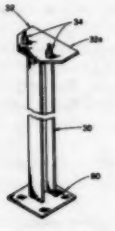
STEEL UTILITY STRUCTURE AND METHOD FOR ASSEMBLY THEREOF

Dwight R. LeBow, 465 Southern Oaks Dr., Lake Jackson, Tex. 77566

Filed Nov. 14, 1989, Ser. No. 436,351

Int. Cl.[5] E04H *12/00*

U.S. Cl. 52—301 **19 Claims**



1. A modular steel utility structure, comprising: a plurality of vertical steel columns, each column having capital and basal steel erection plates fixedly secured at respective upper and lower ends thereof, said capital plate having at least one alignment pin extending upwardly therefrom and laterally spaced from said column, said basal plate having at least one vertical alignment aperture spaced laterally from said column; at least one horizontal steel frame, each frame comprising horizontal steel beams and a plurality of top and bottom erection plates fixedly secured on said beams, said bottom erection plate having an alignment aperture spaced from said beams for receiving in registration the pin from a capital plate of a column immediately therebeneath, said top erection plate having an upwardly projecting alignment pin which is received in registry by the aperture in a basal plate of a column immediately thereabove.

4,965,975

MEANS FOR ERECTING A WALL OF WALL BLOCKS, PREFERABLY OF GLASS

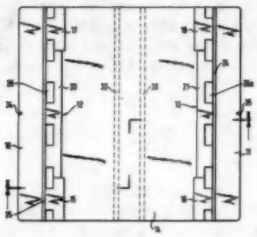
Willi Schwarz, Wittland 5, 2300 Kiel 1, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 319,571

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1989, 8902153

Int. Cl.[5] E04B *1/40, 2/20*; E04C *1/42*

U.S. Cl. 52—308 **9 Claims**



1. An assembly for erecting a wall of preformed glass wall blocks, comprising:

support means for extending between the adjoining faces of each adjacent pair of blocks in the wall;

each support means comprising a support member of plastic material of length less than the length of a wall block, the support member having a marginal support portions extending along its opposite edges, and a flat, elongated strip longer than said support member slidably mounted on said support member, said support member having retaining portions extending adjacent each of said marginal support portions, said retaining portions having opposed grooves which face inwardly towards one another for slidably receiving the opposing side edge portions of said strip;

said support member being shorter than the distance between opposing wall surfaces of said blocks to leave recesses adjacent the outer wall surfaces at the joints between adjacent blocks for filling with sealing material; and said retaining portions including regions adjacent the opposite ends of said support member which are thicker than the remainder of said retaining portions.

4,965,976

END CAP FOR EXPANSION JOINT

Jack D. Riddle, Canton, and John D. Nicholas, Lawrenceville, both of Ga., assignors to MM Systems Corporation, Tucker, Ga.

Filed Sep. 22, 1989, Ser. No. 411,418

Int. Cl.[5] E04B *1/62*

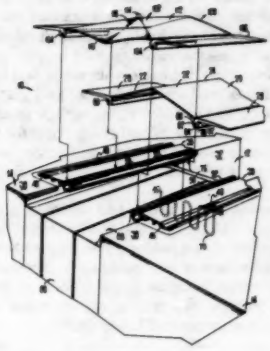
U.S. Cl. 52—396 **16 Claims**

1. An apparatus for sealing an elongated joint between adjacent dynamic structures, said apparatus comprising:

an elongated convex elastomeric cover having an opposing

pair of lower edges and an apex, each of said lower edges of said convex being attached to a corresponding one of said adjacent dynamic structures such that said convex cover spans said joint between said adjacent structures to seal said joint, and

said apex at one end of said convex cover being folded downwardly and inwardly to form a transverse wall member terminating one end of said elongated convex elastomeric cover transverse to the longitudinal axis of said joint, said transverse wall member having at least one pleat formed therein transverse to the direction of movement of said adjacent dynamic structures, such that said transverse wall member folds and unfolds along said pleat as said joint closes and opens.



4,965,977

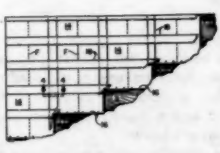
INSULATED PANELIZED ROOFING SYSTEM

Daniel R. White, 355 E. Las Colinis Blvd., Suite 217, Irving, Tex. 75039

Filed Feb. 13, 1990, Ser. No. 479,453

Int. Cl.[5] E04B *5/00*

U.S. Cl. 52—410 **37 Claims**



1. A panelized roof system construction for application over a roof substrate comprising:

a plurality of panels positioned on said substrate in abutting relationship so as to form joints therebetween and substantially cover the top surface of said substrate, said panels comprising a foam insulation board having a synthetic fiber mat bonded to the top surface thereof, said synthetic fiber mat being saturated with bituminous material so as to render said foam insulation board substantially waterproof;

a plurality of fasteners positioned in spaced-apart relationship along at least two sides of each of said panels and adjacent to said joints, said fasteners penetrating the panels so as to secure said panels to said roof substrate; and

a plurality of bitumen-saturated synthetic fiber strips being applied with hot-mopped asphalt or other suitable non-torched adhesive so as to overlap both said joints between said panels and any of said fasteners positioned adjacent thereto.

4,965,978

SPACERS FOR THE CONSTRUCTION OF WALLS FROM SUPERIMPOSED BLOCKS

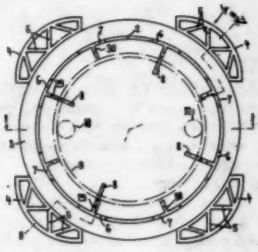
Rolf Schelwiller, Duolterlistrasse 9, CH-6052 Hergiswil, Switzerland

Filed Jun. 7, 1989, Ser. No. 362,813

Claims priority, application European Pat. Off., Jun. 14, 1988, 88810401.5

Int. Cl.[5] E04C *1/10*; E04B *2/46*

U.S. Cl. 52—438 **22 Claims**



1. A spacer comprising

a substantially circular ring having an interior and an exterior;

means for centering said spacer in a block having an interior opening, said means for centering connected to the interior of said ring; and

a plurality of substantially horizontal evenly spaced spacing members, each of said spacing members having an inner side which is connected with the exterior of said ring, an outer side, at least two lateral sides and a plurality of bracings extending between the outer side and inner side of said spacing members, the bracings being triangularly disposed.

4,965,979

CONCRETE BLOCK WALL

Ronald J. Larrivee, 1762 Pound Hill Rd., and John D. Downs, Overlea Rd., R.F.D. #2, both of North Smithfield, R.I. 02895

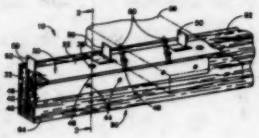
Filed May 15, 1989, Ser. No. 352,138

Int. Cl.[5] E04C *1/08, 1/10*

U.S. Cl. 52—585 **2 Claims**

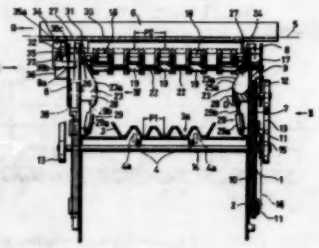
1. A concrete block wall creating a woven effect comprising a plurality of blocks having an arcuate face each with planar upper and lower surfaces, radiused ends and a central opening and laid in superimposed courses; the blocks in each course being laid end to end; the blocks in the adjacent course having the radiused ends overlying a portion of the adjacent course and a plurality of interlocking members, each member having a frontal portion and a rear portion, said rear portion engaging the said openings in adjacent courses and the frontal portion engaging the radiused ends of juxtaposed blocks in the same course.

4,965,980
DECK BRACKET
Weston Leavens, 4972 Coronado Ave., San Diego, Calif. 92107
Filed Aug. 10, 1989, Ser. No. 392,015
Int. Cl.[5] E04B 1/38
U.S. Cl. 52—712 9 Claims



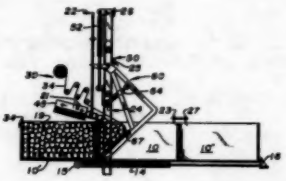
1. An anchoring bracket for use in a attaching a series of substantially parallel boards to a generally transversely oriented member, such as a joist, having a top surface for receiving the boards and having a side surface substantially perpendicular thereto; said bracket comprising:
a rain-spacer side having:
a spacing portion for placement on the top of the joist for spacing a board from the joist; and
an extended portion attached to said spacing portion for extending outward past the edge of the joist; said extended portion having an outer end; and
a joist attachment side including:
an attachment portion disposed generally perpendicular to said rain spacer-side for attachment to the side of the joist underlying said extended portion of said rain spacer side; and
an angled portion connected to said attachment portion and to said outer end of said extended portion and including a hole therethrough for receiving a fastener for fastening a board lying on said spacing portion atop a joist to said bracket.

4,965,981
SHIFTING APPARATUS FOR OBJECTS SUCH AS EGGS
Kouichi Kikuchi, Tsuyama, Japan, assignor to Kyowa Machinery Co., Ltd., Okayama, Japan
Filed Aug. 29, 1989, Ser. No. 400,007
Claims priority, application Japan, Sep. 3, 1988, 63-221061
Int. Cl.[5] B65B 5/08, 35/56, 39/12
U.S. Cl. 53—142 7 Claims



1. An apparatus for shifting objects, such as eggs, from an upper conveyor to each of containers transferred by a lower conveyor, the apparatus comprising:
substantially horizontal holder guide means arranged between said upper and lower conveyors;
displacing means for vertically moving said holder guide means between an upper position and a lower position;
a plurality of holders carried by said guide means for receiving a corresponding number of objects from said upper conveyor when said holder guide means assumes said upper position, said holders being slidable on said guide means and including two end holders;
spacer means for maintaining even spacing between said holders at least in said upper and lower positions of said holder guide means;
pitch changing means for causing said holders to slide on said holder guide means in response to vertical movement of said holder guide means in a manner such that said holders are spaced maximally from each other when said holder guide means assumes said upper position but spaced minimally from each other when said holder guide means assumes said lower position, said pitch changing means comprising inclined guide surface means arranged adjacent to at least one of said end holders for forcing said one end holder toward the other end holder as said holder guide means is vertically moved toward said lower position;
adjusting means for causing said inclined guide surface means to pivot about a pivotal axis located adjacent to said upper position of said holder guide means, thereby changing the inclination of said guide surface means; and
discharging means for causing said holders to discharge the received objects into said container when said holder guide means assumes said lower position.

4,965,982
FRUIT BIN FILLER
Leslie S. Jesperson, 12204 Nelson Rd., Yakima, Wash. 98903, and Bruce L. Jesperson, 101 Hovde La., Selah, Wash. 98942
Continuation-in-part of Ser. No. 153,190, Feb. 8, 1988, Pat. No. 4,815,258. This application Mar. 24, 1989, Ser. No. 328,294
Int. Cl.[5] B65B 1/04, 5/10, 39/00
U.S. Cl. 53—248 13 Claims



1. An apparatus for loading objects comprising:
a. a tower and a bed, said bed including transport means for moving at least one container past a loading location;
b. a carriage that is vertically movable from a maximum upper position and a maximum lower position within a frame work of said tower;
c. a twisted conveyor means comprising a twisted and inclined portion for dispensing said objects from a discharge opening positioned adjacent said loading location;
d. means for moving said carriage between said maximum upper position and said maximum lower position;
e. a cradle rotatable engaged to a portion of said carriage along an axis of rotation parallel to the plane of vertical movement of said carriage, wherein said cradle is rotatable about said axis of rotation between a maximum rearward position and a maximum forward position, said cradle including a baffle having a width slightly less than the width of said container;
f. means for rotating said cradle between said maximum rearward position and said maximum forward position;
g. control means for coordinating the independent motions of said carriage, said cradle and the movement of said container past said loading location in order to load said objects into said container, by controlling the operation of said means for moving said carriage, said means for rotating said cradle and said transport means.

4,965,983

METHOD AND APPARATUS FOR FEEDING STRIPS TO A PACKAGING MACHINE

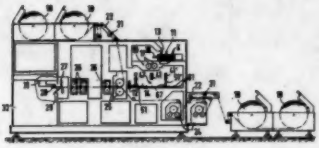
Roland Muller, Remchingen; Manfred Gries, Ettlingen, and Roland Klein, Eisingen, all of Fed. Rep. of Germany, assignors to Sieber Verpackungstechnik GmbH & Co. KG, Reimchingen, Fed. Rep. of Germany

Filed Feb. 2, 1989, Ser. No. 305,171

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805093

Int. Cl.[5] A21C *15/04*; B26D *7/06*

U.S. Cl. 53—435 30 Claims



21. A method for feeding strips to a packaging machine for packing the strips individually in foil, comprising the steps of:

substantially simultaneously cutting from a card-like material a plurality of individual strips lying parallel to each other;

disposing the plurality of cut strips in upright positions thereof in a transfer means;

pivoting said transfer means such that the individual strips lie substantially horizontally adjacent each other;

transferring groups of said strips from said transfer means under constrained guiding movement to a table for movement of the strips along predetermined guide paths defined by the table; and

conveying the group of strips substantially simultaneously along the table while constraining the strips for guided conveyance into engagement between a pair of sealing rolls of the packaging machine.

4,965,984

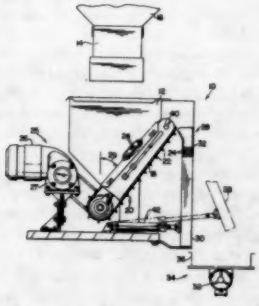
METHOD AND APPARATUS FOR ALIGNING ELONGATED ARTICLES

Richard Farnsworth, Portland, Oreg.; Donald Deines, and Alvin Deines, both of Pasco, Wash., assignors to Package Machinery Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 256,045, Oct. 11, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 412,763

Int. Cl.[5] B65B *19/34*, *35/56*

U.S. Cl. 53—444 37 Claims



1. An apparatus for aligning a charge of elongated articles before presentation to a bagging machine, said apparatus comprising:

a bucket for receiving the charge within an interior cavity thereof;

a conveyor means comprising a side wall of said bucket interior cavity substantially encompassing the vertical extent thereof, said conveyor means having a plurality of spaced flights each adapted to receive a portion of the charge from said receiver bucket at a first conveyor position, said conveyor means for advancing said charge portion on said flights to a conveyor second position with the articles of said charge portion having the elongated dimension thereof substantially parallel to a longitudinal axis of said flights;

a collector bucket for receiving said aligned charge portions at said conveyor means second position and storing said received portions in alignment with said flight longitudinal axis; and

a means for discharging said aligned charge to the bagging machine when said collector bucket has received all of said charge.

4,965,985

BAG MAKING, FILLING, AND PACKAGING METHOD AND APPARATUS

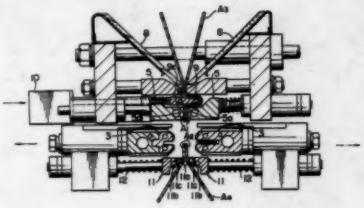
Norio Masubuchi, and Heiemon Akiyama, both of Chiba, Japan, assignors to Tokyo Automatic Machinery Works, Ltd., Tokyo, Japan

Filed Jan. 25, 1989, Ser. No. 301,123

Claims priority, application Japan, Jun. 28, 1988, 63-162042

Int. Cl.[5] B65B *7/06*, *51/30*, *51/32*

U.S. Cl. 53—479 28 Claims



23. A method of closing and sealing an end of a sleeve comprising:

positioning a sleeve along a feeding passage from an upstream to a downstream side;

heat sealing an end of said sleeve with a heat sealing device;

moving said heat sealed end of said sleeve upstream to proximate a cooling device; and

moving a cooling device toward said heat sealed end of said sleeve for cooling said end.

4,965,986

APPARATUS FOR FORMING, FILLING AND SEALING BAG-TYPE PACKAGES

Wolfgang Klinkel, Sala Capriasca, 6954, Bigorio, Switzerland

Filed Jun. 9, 1989, Ser. No. 363,964

Claims priority, application Switzerland, Jul. 15, 1988, 02714/88

Int. Cl.[5] B65B *9/08*, *41/16*

U.S. Cl. 53—551 12 Claims

1. An apparatus for forming, filling and sealing bag-type packages, comprising:

means for infeeding a foil web from a supply roll;

a feed pipe for infeeding a product to be packed in the bag-type packages to be formed and sealed;

said feed pipe having an upper end;

a formed shoulder arranged at said upper end of said feed pipe;

said foil web being drawn over said formed shoulder to coil

the foil web and form a hose having a lengthwise direction;

longitudinal sealing means for sealing said hose in said lengthwise direction;

hose conveying means for conveying said hose along said feed pipe;

transverse sealing means for sealing said hose in a transverse direction with respect to said lengthwise direction and forming the bag-type packages in predetermined package distances;

the foil web and said hose formed from the foil web having a predetermined longitudinal downstream travel direction and a predetermined longitudinal return travel direction;

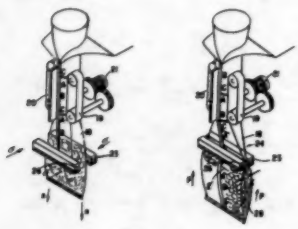
said transverse sealing means being stationarily arranged with respect to travel of said hose in said predetermined longitudinal downstream and return travel directions;

said means for infeeding the foil web having drivable web entrainment means which act upon the foil web and are arranged upstream of said formed shoulder as viewed in said predetermined longitudinal downstream travel direction;

said drivable web entrainment means having drive means provided for at least return travel of the foil web in said predetermined longitudinal return travel direction;

said hose conveying means having drivable hose entrainment means which act upon said hose;

said drivable hose entrainment means having reversible drive means for selective movement of said hose in said



predetermined longitudinal downstream travel direction and in said predetermined longitudinal return travel direction;

said transverse sealing means containing at least two sealing jaws operating in two stages;

said transverse sealing means further containing moving means for transversely moving said at least two sealing jaws relative to each other as well as relative to said hose;

said moving means containing:

at least two eccentric levers having two ends and being respectively connected at one of their two ends with said at least two sealing jaws;

at least two axles for respectively pivotally mounting said at least two eccentric levers at an other one of their two ends;

a common shaft at which said at least two

eccentric levers are mounted at a predetermined location between their two ends;

additional drive means for reversibly rotating said common shaft about its axis in order to thereby reversibly move said at least two eccentric levers transversely relative to each other as well as relative to said hose;

said additional drive means reversibly moving said at least two sealing jaws in a first stage to form in said hose a transversely disposed constrictive location which narrows up to a predetermined gap width; and

said additional drive means moving said at least two sealing jaws in a second stage to close said at least two sealing jaws in order to from a transverse sealing seam.

4,965,987

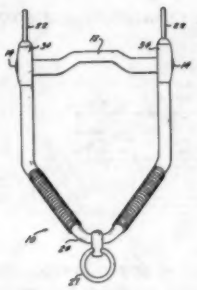
HORSE TACK BIT

Gerald R. Bork, 36631 Hathaway, New Baltimore, Mich. 48047

Filed Oct. 5, 1988, Ser. No. 253,682

Int. Cl.[5] B68B *1/06*

U.S. Cl. 54—7 9 Claims



1. A horse tack bit comprising:

a mouthpiece having two ends;

two adjustable connectors, each having a shaft portion with a bore extending through the longitudinal axis thereof and a tubular leg portion joined to and extending outward from the shaft portion;

thread means, formed on the leg portion of each adjustable connector and on each end of the mouthpiece, for threadingly attaching the mouthpiece to the adjustable connectors;

the thread means in one of the leg portions of the adjustable connectors and the ends of the mouthpiece being oppositely threaded from each other such that rotation of the mouthpiece when connected to the adjustable connectors causes a change in the distance that the mouthpiece is threaded into the adjustable connectors and the distance between the adjustable connectors;

two opposed tubular cheekpieces, each of said cheek pieces including an angled shank portion disposed adjacent to an adjustable connector and extending rearwardly and downwardly and inwardly from the mouthpiece and a flexible portion;

a bridle ring disposed at the end of each adjustable connector opposite the end disposed adjacent to the cheek piece;

a connector disposed at the end of each cheek piece approximate the flexible portions thereof and having opposed arms and a central leg angularly disposed with respect to the arms;

flexible connecting means extending through the cheek pieces and the adjustable connectors for connecting the bridle rings to the arms of the connector; and wherein

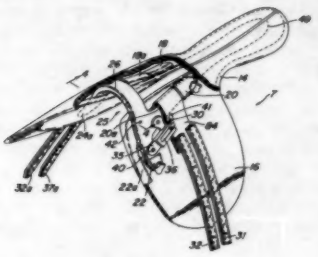
when a set of reins is attached to the connector, tensioning the reins in one direction indicating a turn in a direction opposite from the direction of tension will cause the connector to exert a cantilever action on the cheek piece and associated bridle ring opposite from the direction of tension with respect to the other cheek piece causing pressure to be applied to the animal's head opposite from the direction of tension, thereby turning the animal's head in the opposite direction of the tension.

4,965,988

SADDLE TREE

Derrick A. Anderson, 1209 Braxton Ct., North Wales, Pa. 19454

Filed Feb. 7, 1989, Ser. No. 307,062
Int. Cl.[5] B68C *1/02*
U.S. Cl. 54—44 16 Claims



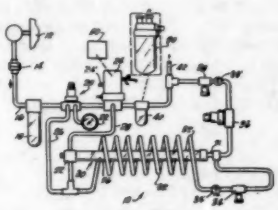
1. An exercise saddle comprising:
(a) a first shaped material having side flaps for positioning upon a race horse in the vicinity of its withers, and said material including a plurality of pockets;
(b) a smooth surfaced tree means having a body portion and four projecting members shaped to conform with said withers, each said member being respectively adapted to fit within one of said pockets and said tree means being made of a thermoplastic composition which permits said members to be formed in a symmetrical configuration and to flex without retaining a permanent set;
(c) a second relatively soft material which substantially conforms to said first shaped material and is juxtaposed to said tree means;
(d) means positioned through said tree and said first and second materials for interconnecting both to form said saddle;
(e) means attached to said tree means for positioning around said horse and for securing said saddle;
(f) a depression formed in said tree means in the vicinity of two said projecting members; and
(g) means further attached to said tree means within said depression for connecting stirrups locks; and
(h) said smooth surfaced tree means and said attached stirrups locks within said depression preventing said exercise saddle from wearing out prematurely.

4,965,989

IN-LINE MOLECULAR SIEVE BED CONVERSION KIT

Lamar Ellis, 320 W. Walnut Ave., Ontario, Calif. 91762

Filed Apr. 10, 1989, Ser. No. 335,703
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—162 1 Claim



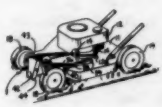
1. A kit for providing any in-line molecular sieve apparatus for separating oxygen from pressurized atmospheric air which comprises:
a sieve bed containing material for separating oxygen from the atmosphere; compressor means for pressurizing atmospheric air; a first conduit means for carrying said pressurized atmospheric air; to said sieve bed; filter means located in said conduit for filtering said pressurized atmospheric air; pressure regulating means between said filter means and said sieve bed; a second conduit means in the form of a spirally wound tube connected to said first conduit means; first check valve and flow regulator means inserted into said second conduit means; upstream and downstream closure caps provided on said sieve bed; upstream closure cap having a first port for introducing pressurized atmospheric air from said first conduit means into the seive bed material; an elongated hollow tubular rod interconnecting said upstream and downstream closure caps; second ports connecting the downstream side of said sieve bed to the hollow portion of said connecting rod; a third port connecting said upstream hollow portion of said elongated hollow tubular rod to a third conduit means located between a solenoid valve and upstream closure cap; a fourth conduit means for carrying oxygen from said second conduit means at the downstream end of said sieve bed through a second pressure regulator means; and through second check valve and flow regulator means; a fifth conduit means connecting said solenoid valve with said fourth conduit means; a neubulizer inserted into said fifth conduit means between said solenoid valve and said fourth conduit means; and a timer for actuating said solenoid valve at selected intervals.

4,965,990

LAWN MOWER AND EDGER ASSEMBLY

Earnest E. Slawson, Sr., and Ara M. Slawson, both of P.O. Box 54025, Pearl, Miss. 39288

Filed Sep. 11, 1989, Ser. No. 406,027
Int. Cl.[5] A01D *34/84*
U.S. Cl. 56—13.7 5 Claims



1. A lawn mower and edger assembly comprising in combination,
an edger assembly mounted to a lawn mower, the lawn mower includes a deck member with a lawn mower engine mounted to a top surface of said deck member, and said engine including a vertical shaft orthogonally directed through said deck member to a position underlying said top surface with a grass cutting blade mounted to a lower terminal end of said shaft, and
a first pulley mounted to said vertical shaft between said blade and said engine, and
second pulley means mounted onto the top surface of said deck member for operative association with said first pulley, and
third pulley means operatively associated with said second pulley means for directing rotative power to said power assembly, and
wherein said second pulley means includes a second pulley and a third pulley fixedly mounted on a pulley shaft, said pulley shaft rotatably mounted to first and second pulley shaft bearings, said first and second pulley shaft bearings fixedly mounted onto the top surface of the deck member forwardly of the engine, and
wherein the third pulley means includes a fourth pulley fixedly mounted to a blade shaft, said blade shaft rotatably

mounted through an elongate cylindrical housing, and spaced bearings mounted within said housing to rotatably support said blade shaft, and said housing including an oil reservoir therewithin, said oil reservoir in operative association with said blade shaft to effect lubrication to the spaced bearings, and an edger assembly housing mounted to a terminal end of the cylindrical housing remote from the fourth pulley, and

wherein a right bracket is pivotally mounted to the deck at one end and pivotally mounted to the housing at its other end, and a left bracket pivotally mounted to an actuator arm at one end and to the housing at its other end, the right bracket including an elongate slot slidably receiving a bolt therethrough, the bolt including a threaded shank aligned with an aperture formed through the left bracket, and a sleeve defined by a diameter greater than a width defined by the slot positioned between the left and right brackets, and a wing nut member threadedly mounted to a terminal end of the threaded shank to secure the right and left brackets together.

4,965,991

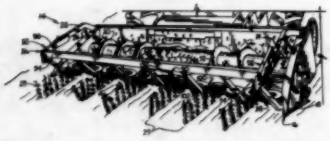
CROP FEEDING SYSTEM

David E. Sauder, Rte. 1, LeRoy, Kans. 66857

Filed Nov. 9, 1989, Ser. No. 434,028

Int. Cl.[5] A01D *45/02*

U.S. Cl. 56—119 **17 Claims**



1. In combination with a crop gathering implement including a crop cutting mechanism extending transversely to an implement direction of travel, the improvement of a crop feeding system, which comprises:

(a) a pair of wheel means mounted in transversely juxtaposed relation and adapted for passing crop plants therebetween through the crop cutting mechanism;

(b) drive means drivingly connected to said wheel means and adapted to counterrotate said pair of wheel means; and

(c) feeding system mounting means mounting said feeding system on said crop gathering implement.

4,965,992

BRIER CUTTER AND METHOD OF USE THEREOF

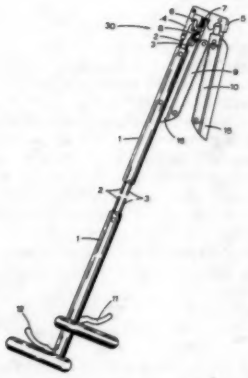
Harold J. Jacobs, P.O. Box 349, Jasper, Ark. 72641

Filed Oct. 13, 1989, Ser. No. 421,160

Int. Cl.[5] A01D *34/08*; B26B *13/00*

U.S. Cl. 56—241 **12 Claims**

1. A device for clearing vegetation consisting of an elongated member, a first cutting member having a cutting edge, a second cutting member having a cutting edge, a first control linkage, a first control means, a latching means, a second control linkage, and a second control means wherein said first cutting member is rigidly affixed to said elongated member adjacent a first end of said elongated member and a second cutting member is pivotally mounted adjacent to said first cutting member; and wherein said first control linkage connects said second cutting member with said first control means, which first control means is mounted adjacent to the second end of said elongated member so that said second cutting member may be pivoted about its mounting point to bring the cutting edge of said second cutting member into a mating relationship with the cutting edge of said first member so that any vegetation which may be located in the gap between the two cutting edges will be sheared off; and wherein said latching means maintains said second cutting member in a position relative to said first cutting member such that the cutting edge of said first cutting member and the cutting edge of said second cutting member form an acute angle so that when said device is pulled through said vegetation, said vegetation is progressively forced toward the apex of said acute angle and effectively sliced off; and wherein said second control linkage connects said latching means and said second control means, which second control means is mounted adjacent to said second end of said elongated member, such that when said latching means is released by said second control means acting through said second control linkage, a biasing means may interact with said second cutting member causing said second cutting member to pivot away from said first cutting member thereby producing an increase in the angle formed by the respective cutting edges of said first and said second cutting members and effectively releasing any vegetation which may



have become lodged between said cutting edges when said second cutting member was in the latched position.

10. A method of clearing vegetation using a device consisting of an elongated member having a first cutting member rigidly mounted adjacent to a first end of said elongated member and a second cutting member pivotally mounted adjacent to said first cutting member so that the cutting edges of said first and said second cutting members form an acute angle with the apex adjacent to said first end of said elongated member and said opening between said first and said second cutting members being directed generally toward said second end of said elongated member, and wherein said second cutting member is flexibly attached to two control means located adjacent to said second end of said elongated member, which method consists of pulling said device through said vegetation in such a manner that said vegetation is engaged in the acute angle formed by said first and said second cutting members and is sheared off by being forced progressively toward the apex of said acute angle as the device is pulled through said vegetation.

4,965,993

PLANT HARVESTER

Lee D. Butler, Kingsburg; Franklin P. Orlando, Morgan Hill, and Don H. Lenker, Salinas, all of Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Dec. 20, 1988, Ser. No. 286,831

Int. Cl.[5] A01D *45/00*

U.S. Cl. 56—327.1 **28 Claims**

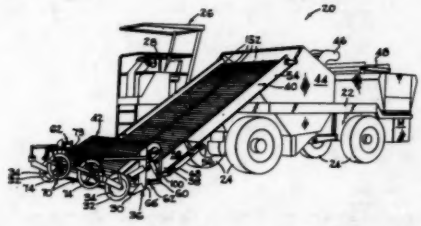
1. A self propelled mobile harvester for removing crops and their foliage from the ground, comprising:

means defining a main conveyor with an upwardly inclined upper run and a forward end;

means defining an inclined pinch bar conveyor having an arcuate front portion disposed closely adjacent the ground and an arcuate rear portion disposed above said main conveyor;

means for severing the foliage and attached crop from the ground;

means defining a plurality of pinch bars on said pinch bar conveyor with adjacent pinch bars being opened when moving around said arcuate front portion for engaging the foliage and being closed in gripping engagement with the foliage when in a lower run of the conveyor and thereafter being opened to release the foliage and crop onto said



main conveyor when moving around said arcuate rear portion; and

means defining a sub-frame connected to said pinch bar conveyor;

means defining a parallelogram linkage connecting said pinch bar conveyor to said main conveyor;

power means connected to said parallelogram linkage for raising and lowering said sub-frame and said pinch bar conveyor; and

ground level sensing means supported by said sub-frame for actuating said power means for raising and lowering said sub-frame for maintaining said front portion of said pinch bar conveyor at substantially the same distance above the ground when the harvester is driven over ground of varying levels.

4,965,994

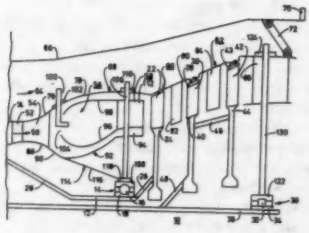
JET ENGINE TURBINE SUPPORT

John J. Ciokajlo, Cincinnati, Ohio, and Henry B. Ritchie, Ft. Pierce, Fla., assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 16, 1988, Ser. No. 285,569

Int. Cl.[5] F02C *3/00*

U.S. Cl. 60—39.75 **9 Claims**



1. A jet engine subassembly comprising:

(a) a turbine shaft having an aft portion;

(b) a turbine ball bearing assembly having a turbine inner race attached to said turbine shaft proximate said aft portion and having a turbine outer race;

(c) a combustor outer casing having a forward end and an aft end;

(e) a plurality of straight and radially-extending tie rods each having a radially innermost end attached to said turbine outer race and having a radially outermost end attached to said combustor outer casing proximate said aft end, said tie rods together being disposed to lie in a plane which is perpendicular to said turbine shaft;

(f) a compressor diffuser having a radially outer duct attached to said combustor outer casing proximate said forward end and having a radially inner duct; and

(g) generally longitudinally-extending, axial-load-supporting means for structurally supporting an axial load between said turbine outer race and said radially inner duct of said compressor diffuser, said axial-load-supporting means radially disposed generally entirely inward of said radially inner duct of said compressor diffuser.

4,965,995

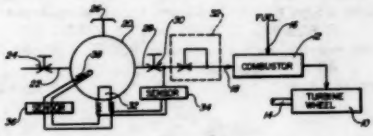
POWER UNIT WITH STORED ENERGY

Roy W. Vershure, Jr., Escondido, Calif., and Kent Weber, Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Sep. 26, 1988, Ser. No. 248,985

Int. Cl.[5] F23R *3/00*

U.S. Cl. 60—39.142 **7 Claims**



1. A power unit comprising:

a combustor for receiving a fuel and an oxidant and combusting the same to provide gases of combustion;

a turbine wheel adapted to receive gases of combustion and produce useful work, said turbine wheel being connected to said combustor;

means for supplying fuel to said combustor; and

means for selectively supplying an oxidant to said combustor including a high pressure storage vessel for receiving and storing the oxidant, valve means selectively operable to control the flow of oxidant from aid vessel to the combustor, an explosive means in said vessel and operable to produce an increase in pressure within said vessel without consuming oxidant therein, and a sensor for triggering said explosive device when a predetermined characteristic of the oxidant is sensed.

4,965,996

POWER PLANT FOR BURNING A FUEL IN A FLUIDIZED BED

Peter D. Hartevelt, Finspong, Sweden, assignor to ABB Stal AB, Finspong, Sweden

Filed Dec. 16, 1988, Ser. No. 285,257

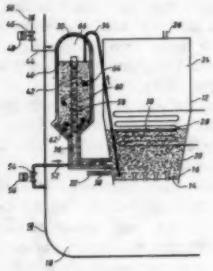
Claims priority, application Sweden, Dec. 16, 1987, 8705026

Int. Cl.[5] F02C *3/26*

U.S. Cl. 60—39.464 **5 Claims**

1. A power plant with a combustion chamber for burning a fuel in a fluidized bed of particulate material comprising a storage container for receiving the bed material from the combustion chamber and for supplying the bed material to the combustion chamber upon changes in the load, the storage container including a sieve means extending within the storage container being in communication with a conduit for the return of the bed material from the storage container to the combus-

tion chamber, said bed material being supplied to the return conduit through said sieve means, said sieve means being de-



signed for preventing slag lumps formed in the bed material from penetrating into the return conduit.

4,965,997

EXHAUST SYSTEM FOR OUTBOARD MOTOR

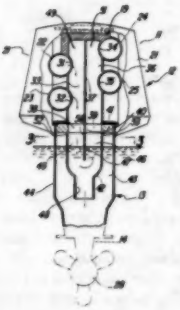
Tamotsu Suzuki; Toyoshi Suzuki; Takashi Iwashita, and Masafumi Sozawa, all of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Feb. 25, 1986, Ser. No. 833,351

Claims priority, application Japan, Feb. 27, 1985, 60-38141

Int. Cl.[5] F01N *7/12*

U.S. Cl. 66—310 **5 Claims**



1. An exhaust system for a marine engine having at least a pair of alternate firing combustion chambers, a first exhaust passage extending from one of said chambers and terminating in a position that is below the water level under at least some running conditions of the associated watercraft, a second exhaust passage extending from another of said chambers and terminating in a position that is beneath the water level under at least some running conditions of the associated watercraft, means providing restricted communication between said first and said second exhaust passages above the water level under said certain running conditions for permitting gas to flow from one of said exhaust passages into the other of said exhaust passages in the event a negative pressure is created in said other exhaust passage for preventing water from being drawn into the combustion chamber communicating with said other exhaust passage, said exhaust passages communicate with an under water exhaust for high speed exhaust gas discharge under the water, and an above the water exhaust with which said exhaust passages communicate for above the water exhaust gas discharge when operating under the certain running conditions.

4,965,998

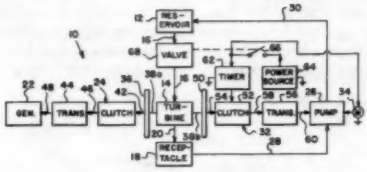
MINI HYDRO ELECTRIC PLANT

Filemon E. Estigoy, C.R.V. P.O. Box 17141, Jeddah 21484 K.S.A., Philippines, and George Spector, 233 Broadway 3815, New York, N.Y. 10007

Filed Feb. 21, 1989, Ser. No. 312,481

Int. Cl.[5] F16D *31/00*

U.S. Cl. 60—325 **1 Claim**



1. A mini hydroelectric power plant which comprises:

(a) a reservoir for holding water therein;

(b) a water driven turbine in fluid communication with said reservoir so that the water flowing into said turbine from said reservoir will operate said turbine;

(c) a receptacle in fluid communication with said turbine for collection the water flowing out of said turbine;

(d) an electric generator for producing electric power;

(e) a first driving means connected between said turbine and said electric generator to drive the same;

(f) a pump in fluid communication between said receptacle and said reservoir;

(g) a second driving means connected between said turbine and said pump to drive the same;

(h) an externally powered motor electrically connected to said pump for assisting said pump in pumping the water out of said receptacle and back into said reservoir so that the water can be used again for operating said turbine; wherein said first driving means includes;

(i) a first flywheel affixed to a first extending portion of a shaft from said turbine;

(j) a first clutch coupled onto said first extending portion of said shaft from said turbine;

(k) a first transmission assembly coupled between said first clutch and said generator; wherein said second driving means includes:

(l) a second flywheel affixed to a second extending portion of said shaft from said turbine;

(m) a second clutch coupled onto said second extending portion of said shaft from said turbine;

(n) a second transmission assembly coupled between said second clutch and said pump; said power plant further comprising:

(o) a timer electrically connected to said second clutch for periodic operation of said second clutch;

(p) a power source for supplying electrical current to said timer and said motor;

(q) a switch electrically disposed between said power source, and timer and said motor, and

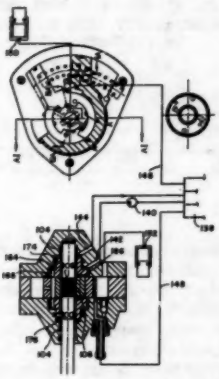
(r) a manually operated valve disposed in fluid communication between said reservoir and said turbine, said valve mechanically connected to said switch so that when said valve is opened said switch will close causing said power source to supply electrical current to said timer and said motor.

4,965,999

TANDEM ROTARY MASTER CYLINDER

Juan S. Bacardit, Barcelona, Spain, assignor to Bendix Espana, Barcelona, Spain

Filed Sep. 5, 1989, Ser. No. 402,949
Int. Cl.[5] B60T 13/16, 11/20; F01C 9/00
U.S. Cl. 60—547.1 10 Claims



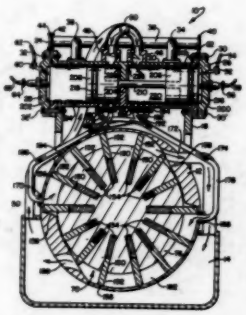
1. Rotary master-cylinder comprising a body (10;102) in which a first vane (20;114) is mounted for rotation in response to rotation of an input shaft (12;100) in order to generate pressure in a first working chamber (18;126) formed in the body (10;102) and delimited in part by the first vane (20;114), characterized in that the master-cylinder further comprises a second vane (30;120) rotatably mounted in the body (10;102) and delimiting with the first vane (20;114) the first working chamber (18;126), the second vane being rotatable in response to rotation of the first vane (20;114) to generate pressure in a second working chamber (62;128).

4,966,000

INTERNAL COMBUSTION ENGINE WITH FLUID DRIVE OUTPUT

Clemens A. Wolters, 6816 Ray Rd., Raleigh, N.C. 27613

Filed Jan. 29, 1990, Ser. No. 471,873
Int. Cl.[5] F02B 71/04
U.S. Cl. 60—595 13 Claims



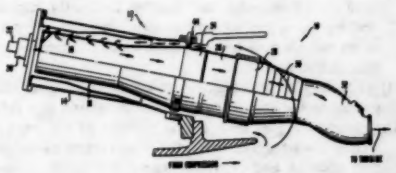
1. An internal combustion engine, comprising:
a fluid drive component, including:
a rotor housing having a rotor receiving portion including a substantially continuous peripheral internally disposed contact surface,
a rotor having an axis of rotation mounted within said rotor receiving portion and configured with respect thereto to provide first and second spaced fluid drive chambers along said contact surface,
drive shaft means for supporting said rotor for rotation about said axis of rotation and having a drive output,
first and second entrance ports in fluid communication respectively with said first and second fluid drive chambers;
first and second exit ports in fluid communication respectively with said first and second fluid drive chambers,
fluid return means for receiving fluid from said first and second exit ports;
an internal combustion component, including:
a cylinder housing having first and second oppositely disposed piston chambers, each extending from retracted positions to respective first and second head locations,
first and second pistons slideably mounted within respective said first and second piston chambers, each said first and second positions having a combustion driven portion and an oppositely disposed pump portion, each said pump portion of said first and second pistons being movable to and from an associated said cylinder retracted position to define respective first and second fluid pump regions,
a connector rod interconnecting said first and second pistons through said retracted positions,
first and second internal combustion means for providing a combustion drive to said combustion drive portions of respective said first and second pistons to input a reciprocating drive thereto; and
conduit means for providing fluid flow from said fluid return means to said first and second fluid pump regions when one of said first and second pistons is driven from a said retracted position, and for providing drive fluid flow from one of said first and second fluid pump regions to a respective said first and second fluid drive chamber when one of respective said first and second pistons is driven toward a said retracted position to impart driven rotational motion to said rotor.

4,966,001

MULTIPLE VENTURI TUBE GAS FUEL INJECTOR FOR CATALYTIC COMBUSTOR

Kenneth W. Beebe, Galway, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 112,973, Oct. 23, 1987, Pat. No. 4,845,952.
This application Dec. 12, 1988, Ser. No. 283,103
Int. Cl.[5] F02C 3/22, 7/22
U.S. Cl. 60—737 2 Claims



1. A combustor for a gas turbine engine comprising:
a preburner;
means for feeding gaseous fuel and air to said preburner;
a fuel injector downstream of said preburner;
said fuel injector including a plurality of parallel venturi tubes and means for forcing substantially all of a gas flow from said preburner to flow through said venturi tubes; each of said venturi tubes including a converging inlet section, a throat section and a diverging diffuser section; each of said venturi tubes provided with at least one orifice in said throat section;
means for feeding a gaseous fuel to each of said plurality of venturi tubes through a respective one of said orifices; and

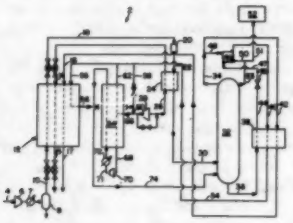
a catalyst bed downstream of said fuel injector passing through said catalyst bed and reacting combustively while passing therethrough whereby energetic gases are emitted downstream of said catalyst bed.

4,966,002

PROCESS AND APPARATUS FOR PRODUCING NITROGEN FROM AIR

Clayton E. Parker, Somerset, and Robert A. Mostello, Somerville, both of N.J., assignors to The BOC Group, Inc., Murray Hill, N.J.

Filed Aug. 11, 1989, Ser. No. 392,816
Int. Cl.[5] F25J *3/02*
U.S. Cl. 62—31 10 Claims



1. A process for the recovery of substantially pure nitrogen product at superatmospheric pressure from air comprising the steps of:

(a) compressing a gaseous feed air;

(b) cooling the compressed air in a heat exchanger against enriched oxygen and nitrogen product streams;

(c) introducing the cooled and compressed air to an intermediate stage of a single distillation column;

(d) separating a substantially pure gaseous nitrogen overhead and an oxygen enriched liquid bottoms from the column;

(e) forwarding substantially all of the oxygen enriched liquid bottoms and a first portion of the gaseous nitrogen overhead to a condenser and therein indirectly exchanging heat between the bottoms and overhead thereby boiling up an oxygen enriched gas stream and condensing a liquid nitrogen stream;

(f) recycling a first major portion of the liquid nitrogen stream to the top of the distillation column as a reflux;

(g) compressing at least a first portion of the oxygen enriched gas stream at about the temperature of the distillation column and recycling the compressed oxygen enriched gas stream to the bottom of the distillation column thereby enhancing nitrogen product recovery from the air;

(h) expanding a second portion of the oxygen enriched gas stream exiting the condenser in an expanding means thereby generating work output to both provide refrigeration for the process and to compress the first portion of the oxygen enriched gas stream which is recycled to the bottom of the distillation column;

(i) warming the second remaining portion of the gaseous nitrogen overhead in the heat exchanger against the compressed air; and

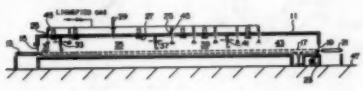
(j) recovering the warmed nitrogen overhead as a substantially pure nitrogen product from the heat exchanger.

4,966,003

CONTINUOUS MULTISTAGE THERMAL PROCESSING APPARATUS, FREEZING CONTROL METHOD FOR USE BY THE APPARATUS, AND APPARATUS FOR PREPARING A RECORDING MEDIUM FOR THE CONTROL METHOD

Yoshisuke Shima, Tokyo, Japan, assignor to Kyokujitsu Company, Ltd., Tokyo, Japan

Division of Ser. No. 377,056, Jul. 7, 1989, Pat. No. 4,934,151.
This application Apr. 5, 1990, Ser. No. 505,190
Int. Cl.[5] F25D *13/06*
U.S. Cl. 62—63 1 Claim



1. A freezing method of continuously freezing a material in a tunnel-shaped thermal processing chamber provided with a transport means for transporting the material to be frozen into said chamber, in which a movable partition means for dividing the inside of the tunnel-shaped chamber into a plurality of sub-chambers is provided in such a manner that the material to be frozen is allowed to be transported, the ambient temperatures before and after the partition means can be changed, and the partition means can be moved in the direction in which said material is transported so that the position of the partition means in the tunnel-shaped thermal processing chamber can be freely adjusted, comprising the steps:

reading the data for the required time which is written on a recording medium; and

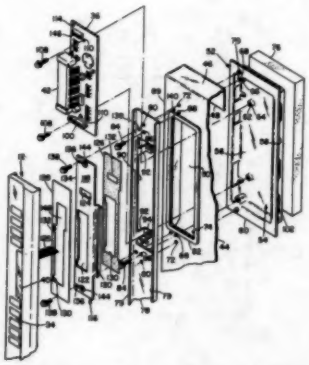
moving the position of the partition means based on said data for the required time, thereby adjusting the length of each sub-chamber at each freezing stage.

4,966,004

ELECTRONIC CONTROL MOUNTING APPARATUS FOR REFRIGERATOR

Brian M. Midlang, Cedar Rapids; Bruce A. Kopf, Marion, and Richard N. Walker, Victor, all of Iowa, assignors to Amana Refrigeration, Inc., Amana, Iowa

Filed Nov. 6, 1989, Ser. No. 432,438
Int. Cl.[5] F25B *49/02*; H01H *13/06*
U.S. Cl. 62—77 16 Claims



1. In combination:

a refrigerator door having a front panel with an aperture;

a housing positioned behind said panel within said door

surrounding said aperture, thereby providing a compartment within said door accessible through said aperture, said panel having at least one locator hole adjacent said aperture, said housing comprising means comprising a locator pin extending through said at least one locator hole in said panel for aligning said housing with respect to said panel and said aperture;

an electronic control board insertable through said aperture and removably mounted with predetermined alignment to said housing within said compartment, said electronic control board having a forward facing visual display;

a control panel for said electronic control board, said control panel comprising a plurality of switches and a window for viewing said forward facing visual display; and

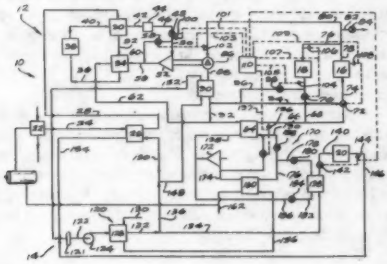
means for mounting said control panel over said aperture so that said window has a predetermined alignment with respect to said visual display.

4,966,005

ADVANCED HYBRID AIR/VAPOR CYCLE ECS

Wiley M. Cowell, Fountain Valley; Quentin C. Malmberg, Hermosa Beach, and Jon M. Edgar, Long Beach, all of Calif., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 12, 1989, Ser. No. 450,141
Int. Cl.[5] F25B *9/00*
U.S. Cl. 62—79 **20 Claims**



1. An environmental control system for an aircraft to provide a flow of conditioned air and to provide heat dissipation for systems aboard the aircraft, comprising:

air cycle system means for receiving a flow of high pressure, high temperature, engine bleed air from the engines of said aircraft, and for utilizing the pressure energy of said bleed air to efficiently condition said bleed air to a lower temperature and pressure, said air cycle system means receiving an amount of bleed air minimally sufficient to maintain pressurization of said aircraft;

liquid cycle system means, having a coolant liquid circulating within a closed loop, for cooling the air within said air cycle system means in heat exchange relationship therewith, and for directly cooling heat generating systems aboard said aircraft;

vapor cycle system means, having a refrigerant contained within a closed loop, for augmenting the conditioning of said air within said air cycle means, and for cooling the coolant liquid within said liquid cycle system means; and

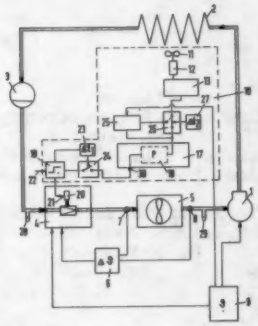
control means for monitoring the cooling requirements of said aircraft and for controlling the temperature and flow of air within said air cycle system means, coolant within said liquid cycle system means, and refrigerant within said vapor cycle system means, to provide the required cooling and pressurization with minimum power consumption.

4,966,006

REFRIGERATION PLANT AND METHOD OF CONTROLLING A REFRIGERATION PLANT

Sven E. Thuesen, Nordborg, Denmark, and Klaus Gollnow, Rödermark, Fed. Rep. of Germany, assignors to Danfoss A/S, Nordborg, Denmark

Filed Sep. 15, 1989, Ser. No. 408,082
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832226
Int. Cl.[5] F25B *41/04*
U.S. Cl. 62—89 **15 Claims**



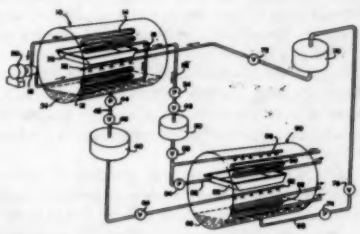
1. A refrigeration plant comprising an evaporator having an inlet and outlet, a compressor having an inlet and an outlet connected to the evaporator inlet, a condenser having an outlet and an inlet connected to the compressor outlet, a controllable expansion valve that is openable and closable, the expansion valve being connected to the outlet of the condenser and having an outlet connected to the evaporator and condenser pressure control means for controlling the condenser pressure in accordance with the degree of opening of the expansion valve to obtain an optimum ratio between the condenser pressure and the evaporator performance.

4,966,007

ABSORPTION REFRIGERATION METHOD AND APPARATUS

William T. Osborne, Severn, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.

Filed May 12, 1989, Ser. No. 351,067
Int. Cl.[5] F25B *15/00*
U.S. Cl. 62—101 **19 Claims**



1. In an absorption refrigeration process which includes the steps of heating a dilute absorbent solution in a first phase to drive off a diluent to form a concentrated absorbent solution

and condensing the diluent and delivering same to a second phase to remove heat from a refrigeration load and reabsorbing the diluent in the concentrated absorbent solution to thereby form a diluted absorbent solution for return to said first phase, the improvement comprising:

maintaining a pressure within said first phase equivalent to the pressure in the second phase so as to minimize absorbent solution temperature differences and eliminate diluent temperature differences; and

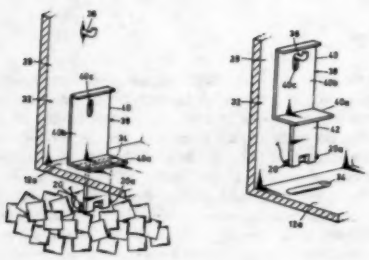
storing functionally sufficient quantities in liquid form of said concentrated and diluted absorbent solutions and said cold diluent produced in said first and second phases so as to enable said first and second phases to be operable independently time-wise of one another.

4,966,008

ARRANGEMENT OF ICE FULLNESS DETECTOR IN ICE MAKING MACHINE

Kazuhiro Yoshida, and Yoshinori Tanaka, both of Toyoake, Japan, assignors to Hoshizaki Electric Company Ltd., Sakae, Japan

Filed Jan. 23, 1990, Ser. No. 468,503
Claims priority, application Japan, Feb. 4, 1989, 1-12419
Int. Cl.[5] F25C *1/00*
U.S. Cl. 62—137 **12 Claims**



1. An ice fullness detector within a stack-on type ice making machine composed of an ice making unit, having an ice making mechanism and a freezing unit, and an independent ice reservoir unit upon which said ice making unit can be separably stacked, wherein ice cakes formed within said ice making mechanism are discharged into said ice reservoir through means of an opening defined within a bottom wall of said ice making unit and stored within said ice reservoir unit, comprising:

a detector mounting assembly having an ice fullness detector mounted upon a lower end of said assembly and a horizontal portion formed at a predetermined position so as to function as a stopper; and

a slot formed within said bottom wall of said ice making unit adjacent to said opening of said ice making unit which allows passage therethrough of said ice fullness detector of said detector mounting assembly but not the horizontal portion thereof;

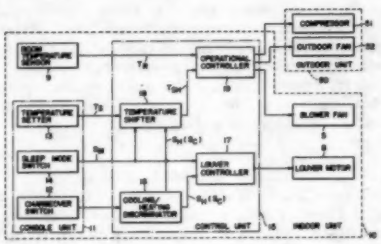
wherein said ice fullness detector attached to said detector mounting assembly can be moved downwardly from a stored position within said ice making unit to an ice detection position within said ice reservoir by moving said lower end of said detector mounting assembly downwardly through said slot until said horizontal portion of said detector assembly is abutted against said bottom wall of said ice making unit.

4,966,009

AIR-CONDITIONER PERMITTING COMFORTABLE SLEEPING DURING HEATING OPERATION

Katsushi Ishii, and Masaya Yamazaki, both of Fuji, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 10, 1989, Ser. No. 377,274
Claims priority, application Japan, Aug. 9, 1988, 63-198577
Int. Cl.[5] F24F *7/007*
U.S. Cl. 62—160 **12 Claims**



1. An air-conditioner provided with an indoor unit comprising a blower fan operable in a mode selected from cooling and heating modes and adapted to blow warmed air into a room, a louver for adjusting the direction of said warmed air from said blower fan, a controller for controlling an amount of air blowing from said blower fan, a temperature of said room and an angle adjustment of said louver, and a control panel for setting temperature, and various modes;

wherein said controller includes

mode selection means for performing changeover operation between an ordinary mode for normal use and a sleep mode for use during a comfortable sleep of a user, and

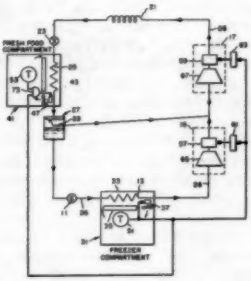
a louver controller for adjusting an angle of said louver so as to blow said warmed air in the ceiling direction in said room when operation of said air-conditioner is set to said sleep mode during heating.

4,966,010

APPARATUS FOR CONTROLLING A DUAL EVAPORATOR, DUAL FAN REFRIGERATOR WITH INDEPENDENT TEMPERATURE CONTROLS

Heinz Jaster, and Warren F. Bessler, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 3, 1989, Ser. No. 293,034
Int. Cl.[5] F25D *17/00*
U.S. Cl. 62—179 **8 Claims**



1. A refrigerator apparatus comprising:

a freezer compartment;

a fresh food compartment not in air flow communication with the freezer compartment;

a refrigerator system having a compressor, condenser, a first expansion valve, a first evaporator situated in said freezer compartment, a second expansion valve, a second evaporator situated in said fresh food compartment, the refrigerator system elements connected in series in a closed loop in a refrigerant flow relationship;

a first fan situated in said freezer compartment for providing air flow over said first evaporator;

a second fan situated in said fresh food compartment for providing air flow over said second evaporator;

a first thermostatic controller situated in said freezer compartment for maintaining a desired temperature in said freezer compartment by causing operation of said compressor and said first fan; and

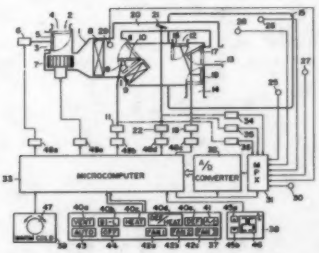
a second thermostatic controller situated in said fresh food compartment for maintaining a desired temperature in said fresh food compartment by causing said second fan to operate as necessary when the compressor is operating.

4,966,011

AIR-CONDITIONING FOR AUTOMOBILES

Katsumi Iida, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,286
Int. Cl.[5] F25D *17/08*
U.S. Cl. 62—179 **6 Claims**



1. An air-conditioner for an automobile, comprising:

(a) cooled air bypass means for introducing air into a passenger compartment of the automobile immediately after its passage around an evaporator, said cooled air bypass means being capable of adjusting the amount of air passing therethrough;

(b) total signal calculation means for calculating a total signal corresponding to a thermal load in the passenger compartment based on at least a vehicle passenger compartment temperature, a setting temperature and an outside air temperature;

(c) discharge mode setting means for setting a discharge mode by actuating a plurality of mode doors of a plurality of discharge outlets based on at least a temperature at the downstream side of said evaporator and an opening of an air-mix door controlled according to the result of calculation by said total signal calculation means;

(d) head part total signal calculation means for calculating a head part total signal corresponding to a thermal load in the vicinity of the head of an occupant based on at least the difference between a temperature in the vicinity of the head of the occupant and a head part setting temperature equivalent to a preset value for air-conditioning temperature in the vicinity of the head of the occupant, and the result of setting by said discharge mode setting means; and

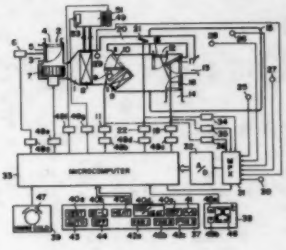
(e) cooled air bypass control means for controlling the operation of said cooled air bypass means according to the result of calculation by said head part total signal calculation means so as to vary the amount of air passing through said cooled air bypass means.

4,966,012

AIR-CONDITIONER FOR AUTOMOBILE

Katsumi Iida, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,285
Int. Cl.[5] F25D *17/08*
U.S. Cl. 62—180 **7 Claims**



1. An air-conditioner for an automobile, comprising:

(a) air-conditioning means for varying the state of air-conditioning in a passenger compartment of the automobile, said air-conditioning means including cooled air bypass means for leading air into the passenger compartment immediately after it passes around the evaporator;

(b) total signal calculation means for calculating a total signal corresponding to a thermal load in the passenger compartment based on at least a vehicle passenger compartment temperature, a setting temperature and an outside air temperature;

(c) head part total signal calculation means for calculating a head part total signal corresponding to a thermal load in the vicinity of the head of an occupant based on at least a temperature in the vicinity of the occupant, a head part setting temperature and a solar radiation quantity;

(d) main control signal calculation means for calculating a first control signal based on said total signal for setting the state of operation of said air-conditioning means;

(e) head part control signal calculation means for calculating a second control signal based on said head part total signal for setting the state of operation of said air-conditioning means;

(f) control signal judgment means for comparatively judging the magnitude of the result of calculation by said main control signal calculation means and the result of calculation by said head part control signal calculation means;

(g) selection means for selecting one of the result obtained by said main control signal calculation means and the result obtained by said head part control signal calculation means based on the result of judgment performed by said control signal judgment means; and

(h) drive control means for controlling the operation of said air-conditioning means based on the result of selection by said selection means.

4,966,013

METHOD AND APPARATUS FOR PREVENTING COMPRESSOR FAILURE DUE TO LOSS OF LUBRICANT

Russell E. Wood, Fayetteville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 18, 1989, Ser. No. 395,874
Int. Cl.[5] F25B *49/02*
U.S. Cl. 62—193 **11 Claims**

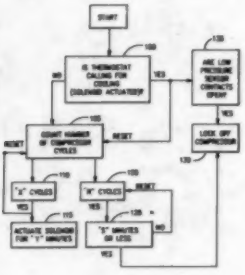
1. Apparatus for preventing compressor failure due to loss of lubricant in a refrigeration system operated responsive to a

thermostat means and serially including compressor means, condenser means, thermal expansion means and an evaporator means comprising:

valve means located in said system intermediate said condenser means and said thermal expansion means;

means for sensing the pressure in said system at a point intermediate said evaporator means and said compressor means;

control circuit means including means for counting the number of compressor operating cycles;



said control circuit means being operatively connected to said thermostat means, said compressor means, said valve means and to said means for sensing whereby said compressor is locked off if said thermostat means is calling for cooling and said means for sensing senses too low of a pressure, and said valve means is opened for a predetermined time thereby causing operation of said compressor means if a predetermined number of compressor operating cycles have taken place without said thermostat means calling for cooling.

4,966,014

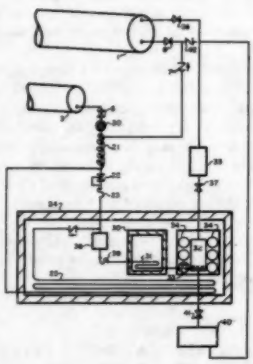
SOLAR ABSORPTION REFRIGERATION

Donald C. Erickson, 1704 S. Harbor La., Annapolis, Md. 21401

Filed May 15, 1989, Ser. No. 351,940

Int. Cl.[5] F25B *27/00*

U.S. Cl. 62—235.1 **9 Claims**



1. An apparatus for producing refrigeration by an intermittent absorption cycle apparatus comprised of a generator/absorber, a condenser, and an evaporator, wherein the improvement comprises:

(a) a second absorber which is cooled by refrigeration produced by said evaporator;

(b) a second evaporator in which liquid refrigerant is evaporated;

(c) a means for routing evaporated refrigerant from said second evaporator to said second absorber;

(d) a means for transferring absorbent from said generator-/absorber to said second absorber;

(e) a reservoir of liquid refrigerant for said second evaporator which is not supply liquid to said evaporator;

(f) a means for reducing the pressure of the liquid refrigerant supplied from said reservoir to said second evaporator; and,

(g) at least one means for supplying heat to said generator-/absorber comprised of a solar radiation collecting apparatus comprised of a stationary arcuate central section having acceptance half angle relative to said generator-/absorber of between 25° and 35°; plus two arcuate outer sections which are hinged to said central section so as to be movable to acceptance half angles between 10° and 24° at any time of the year.

4,966,015

APPARATUS FOR THE PRODUCTION OF SMALL CLEAR ICE BODIES

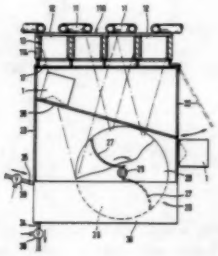
Theo Wessa, Siedlung 19, 6751 Mackenbach/Pfalz, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 324,400, Mar. 16, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 465,953

Claims priority, application European Pat. Off., Mar. 19, 1988, 88104430

Int. Cl.[5] F25C *1/04*

U.S. Cl. 62—347 **9 Claims**



1. Apparatus for producing small clear ice bodies (1), comprising an evaporator (10, 110) connected to a refrigeration cycle and having freezer cells (12) with an upper end and a lower end with said cells closed laterally and at the upper end and open at the lower end, a water trough (30) faced downwardly from said evaporator (10, 110) an inclined cover (36) positioned between said water trough (30) and said evaporator (10, 110) for guiding small ice bodies (1) from said freezer cells into a storage container, and a mechanical spraying device (20) arranged to spray water from the trough (30) into the freezer cells (12), defrosting elements (17) are located below the lower ends of said freezer cells, said trough (30) is filled via a supply pipe (35) at the start of the freezing cycle and is drained at the end of the freezing cycle through a drain (34), wherein the improvement comprises that said defrosting elements (17) are formed of metal strips (17) in thermal contact with one another and located adjacent the lower ends of said freezer cells and extending toward said trough and said metal strips each have an upper edge and a lower edge with the upper edge spaced closely from the lower ends of said freezer cells, said spraying device comprises at least one bucket wheel (21, 126) rotating around a horizontal shaft (29), and including two spaced parallel plates with at least one vane extending therebetween with said vane bent in a concave manner and facing toward said

freezer cells in the direction of rotation of said shaft for spraying water from said trough into said freezer cells.

4,966,016

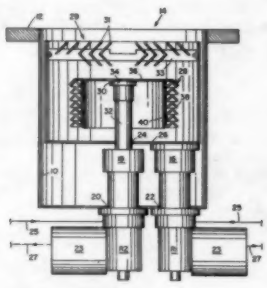
CRYOPUMP WITH MULTIPLE REFRIGERATORS

Allen J. Bartlett, 10 Jillson Cir., Milford, Mass. 01757

Continuation of Ser. No. 310,222, Feb. 13, 1989, abandoned, which is a continuation of Ser. No. 7,019, Jan. 27, 1987, abandoned. This application Oct. 17, 1989, Ser. No. 423,728

Int. Cl.[5] B01D *8/00*

U.S. Cl. 62—55.5 **18 Claims**



1. A cryopump comprising: first and second independently driven refrigerators each having a cold finger to separately control the temperature of a radiation shield and a primary pumping surface such that said shield is in thermal contact with, a cold end of the cold finger of the first refrigerator, and such that the primary pumping surface is spaced from and surrounded by the radiation shield, and is in thermal contact with the cold finger of the second refrigerator.

4,966,017

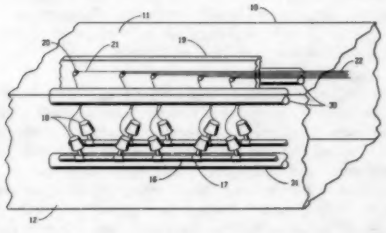
FIBER CREEL HUMIDIFICATION

Terry S. Chern, Richmond, Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 215,658, Jul. 6, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,797

Int. Cl.[5] D06B *3/06*

U.S. Cl. 68—5 C **5 Claims**



1. Controlled humidity creel apparatus for maintaining a high yarn moisture content during unwinding comprising:

package support means comprising a spindle for supporting a yarn package for unwinding;

enclosure means for providing a partial envelope about said package on said package support means and about a portion of the yarn adjacent said package being unwound, said enclosure means partially isolating the atmosphere within said envelope from ambient conditions outside of said envelope; and

humidity controlling means comprising:

a supply pipe mounted above the package support means for introducing gas and moisture into said enclosure means, a return pipe mounted under the package support means for receiving gas and moisture from said enclosure means, a main leg connecting said return and supply pipes, and a blower in said main leg for circulating gas and moisture received from said return pipe into said supply pipe;

moisture supply means mounted in the main leg for supplying moisture to said circulating gas;

humidity measurement means mounted in the main leg upstream from the moisture supply means for measuring the humidity of the gas being circulated through said enclosure means;

control means responsive to said humidity measurement means for actuating said moisture supply means when the humidity measured by said measurement means is below a predetermined level whereby the humidity level of the gas within said enclosure is maintained at or above said predetermined level.

4,966,018

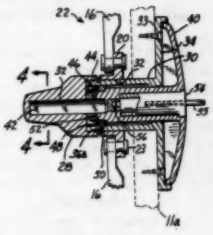
LOW PROFILE, SECURE CAMPER SHELL LATCH

Peter Hauber, 9001 No. Glenoaks, Sun Valley, Calif. 91352

Continuation of Ser. No. 159,659, Feb. 24, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 427,322

Int. Cl.[5] E05B *13/10*

U.S. Cl. 70—208 **10 Claims**



1. Low profile, high security latch for a camper shell door and the like, comprising a housing having separable interfitting inner and outer portions defining a common bore and a zone of interfittment, said housing inner portion including a latch means and said housing outer portion including a outwardly facing recess adapted to receive an outside handle in protected relation, said housing inner portion having a circumferential groove, said housing outer portion having an inner housing groove-opposing slot within said zone of interfittment, clip means encircling said common bore and joining said housing inner and outer portions in common bore defining relation by simultaneously engaging said housing outer portion at its said slot and said housing inner portion at is said circumferential groove against relative axial movement while permitting relative rotational movement between said housing inner and outer portions, a latch operating shaft journaled in said housing common bore for rotational and translational movement, said shaft being of less length than said common bore, outside handle means fixed to said shaft, said handle means being adapted to rotate said shaft in latch means locking and unlocking relation in a first relatively outward translational position of said shaft freely of said housing outer portion recess and to interfit with said housing outer portion recess in a second relatively inward translational position of said shaft, whereby the profile of said handle is reduced and said handle is protected against unauthorized rotation, and key-operated retainer means selectively retaining said handle and shaft in said second translational position.

4,966,019

ANTI-THEFT ARRANGEMENT FOR A VEHICLE

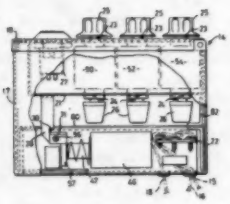
David Hoffmann, and Ralph L. Harris, both of 39 Sherborne Ave., Luton, Bedfordshire LU2 7BD, United Kingdom

Filed Aug. 1, 1989, Ser. No. 388,255

Claims priority, application United Kingdom, Dec. 7, 1987, 8728531

Int. Cl.[5] E05B 65/12

U.S. Cl. 70—257 8 Claims



1. An anti-theft arrangement for a motor vehicle comprising an electrically operable engine disabling device associated with a system or component essential to operation of the engine of the vehicle and which in a first state permits normal operation of the associated system or component and which in a second state does not;

means for connecting a supply of electrical current to said device, said supply being controlled by combination switching means and in which the arrangement is such that said electrically operable engine disabling device is automatically placed in its state preventing normal operation of the engine upon disconnection of the device from said supply of electrical current; and

said combination switching means comprising a plurality of multi-position rotary switches series connected, each having a respective manually operable outer operating knob, for each said switch, scale means and marker index means for each said knob whereby the rotary position of each said knob can be identified.

4,966,020

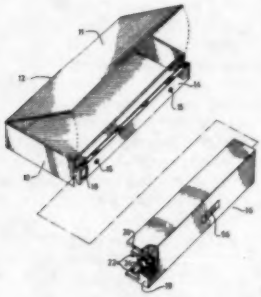
LOCKING MECHANISM

Scott M. Fotheringham, and Robin H. Fotheringham, both of Mississauga, Canada, assignors to 880335 Ontario Inc., Niagara Falls, Canada

Filed Jun. 6, 1989, Ser. No. 362,309

Int. Cl.[5] E05B 47/00

U.S. Cl. 70—276 15 Claims



1. A locking and unlocking system, comprising a locking mechanism for preventing sliding movement between first and second slidably juxtaposed parts, and a decoupling unit, said locking mechanism comprising magnetically actuatable pin means in a blind hole in said first part and a detent opening or recess in said second part, at least a portion of said pin means being magnetically attractable, said pin means being moveable between a first position in which a pin portion of said pin means enters said detent, thereby preventing sliding movement between said first and second parts, and a second position in which said pin portion is retracted into said blind hole from said detent, thereby permitting sliding movement, and means for biasing said pin portion into said first position, said decoupling unit comprising a frame adapted to receive the locked first and second parts and a magnet mounted in said frame adjacent the position of said pin means when said parts are positioned in said frame, so as to attract said pin means to retract it to said second position, thereby permitting sliding decoupling of said first and second parts.

4,966,021

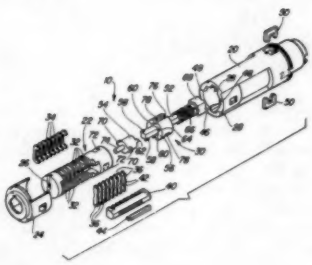
REPROGRAMMABLE LOCK AND KEYS THEREFOR

Nigel Boag, Costa Mesa, Calif., assignor to Masco Building Products Corp., Taylor, Mich.

Filed Nov. 4, 1988, Ser. No. 267,160

Int. Cl.[5] E05B 25/00

U.S. Cl. 70—383 22 Claims



1. A reprogrammable lock assembly comprising:

a housing;

a carrier plug rotatably mounted in said housing and having a plurality of radially extending slots spaced from one another along the longitudinal axis of said plug, said plug including a longitudinal slot adapted to receive a key;

a plurality of tumbler members respectively mounted in said slots of said plug in adjustable edge engagement with corresponding tumbler members in a variable code pattern so that the insertion of a key with a code pattern matching the selected code pattern of said key-followers causes said key-followers to retract all said tumbler members into the periphery of said plug;

a retainer bar mounted on said carrier plug and interposed in said housing to hold said tumbler members and said key followers in edge engagement during normal operation of the lock and to allow disengagement of said key-follower members and said tumbler members when said plug is rotated to a program position within said housing; and

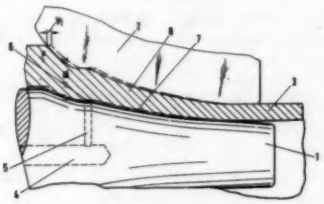
a latch controlling driver assembly received within the inner end of said housing and matingly engaging said carrier plug, said driver assembly selectively axially movable between a locked position preventing rotation of said carrier plug, a program position allowing rotation of said carrier plug in a first direction from an initial reference position using a program key for reprogramming said lock assembly, and an unlock position allowing rotation of said carrier plug in a second direction from said reference position using a use key to unlatch said lock assembly, said use key having a greater length than said program key such that said use key axially displaces said driver assembly to said unlock position and said program key displaces said driver assembly to said program position.

4,96.,022

METHOD AND APPARATUS FOR LUBRICATING THE MANDREL UPON THE MANUFACTURE OF SEAMLESS TUBES BY THE COLD PILGER PROCESS

Horst Stinnertz, Willich, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Dec. 12, 1989, Ser. No. 449,596
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3844163
Int. Cl.[5] B21B *45/02*
U.S. Cl. 72—41 7 Claims



4. An apparatus for the manufacturing of seamless metal tubes by the cold pilger process wherein a roll stand including tapering calibrated rolls is reciprocatingly movable in the direction of rolling at a predetermined stroke to define a reduction zone, the rolls rolling with alternating direction of rotation over the material being rolled and a tapering mandrel inside said material for reducing the diameter and wall thickness of said material, comprising:

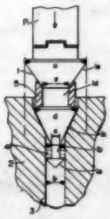
at least one of said rolls (2) and said mandrel (1) having a surface discontinuity within said reduction zone for causing a zone of interruption (6) within which no contact occurs between said material to be rolled (3) and said mandrel (1).

4,966,023

STAGED TOOL FOR BORING A HOLE IN AN ELEMENT BY AXIAL PENETRATION OF THE TOOL

Robert Prunier, Carpentras; Regis L. Ruiz, Dijon, and J. Pierre Ravier, Quetigny, all of France, assignors to Agence Regionale De Developpements technologiques, Dijon, France

Filed Aug. 12, 1988, Ser. No. 231,875
Claims priority, application France, Aug. 13, 1987, 87 11554
Int. Cl.[5] B21C *23/32, 25/04*
U.S. Cl. 72—41 54 Claims



1. A staged tool for boring a hole in an element, that has been heated to a predetermined temperature, by axial penetration of the tool in a desired direction, said tool comprising:

a front end portion having a first diameter;

a first working portion with a cross-sectional area that increases from a second diameter to a third diameter to respectively define a minor base and a major base for said working portion, said second diameter being less than said first diameter of said front end portion, said minor base being positioned so as to be disposed closer to said front portion than any other part of said first working portion;

a first coupling portion interconnecting said front end portion and said first working portion, said first coupling portion having a fourth diameter which is less than said first diameter of said front end portion, and less than or equal to said second diameter of said first working portion, to thereby define a first reservoir;

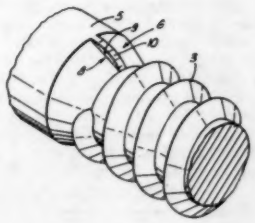
a first lubricant located in said first reservoir prior to boring for progressively lubricating said first working portion during said axial penetration of said tool in said element.

4,966,024

METHOD OF FORMING A SCREW THREADED FASTENER

George D. Hewison, Twyford, Great Britain, assignor to ITW, Ltd., Surrey, England

Division of Ser. No. 241,891, Sep. 8, 1988, Pat. No. 4,878,793.
This application Jun. 5, 1989, Ser. No. 382,145
Claims priority, application United Kingdom, Sep. 8, 1987, 8721048
Int. Cl.[5] B21H *3/02;* B21D *17/04*
U.S. Cl. 72—88 22 Claims



1. A method of forming a screw threaded fastener particularly intended for use in attaching a corrugated roofing sheet to an underlying metal purlin, comprising the steps of:

forwardly extruding a part of a fastener blank, having a first predetermined diameter, through a die so as to reduce said first predetermined diameter to a second predetermined diameter, and to simultaneously form forming means upon an axially tapered transition portion defined between, and smoothly interconnecting, said first and second diameter portions of said blank;

performing forming operations upon said blank so as to form a drill point upon a free end of said second diameter portion of said blank, and a head upon a free end of said first diameter portion of said blank; and

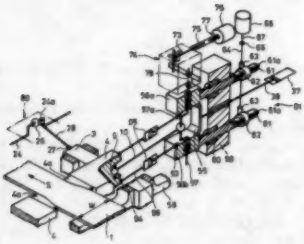
performing thread rolling operations upon said blank so as to form a first screw thread, having a first crest diameter, upon said first diameter portion of said blank adjacent to said head, and a second screw thread, having a second crest diameter which is less than said first crest diameter of said first screw thread, upon said second diameter portion of said blank adjacent to said drilling point such that a residual unthreaded blank portion is defined upon said first diameter portion of said blank so as to be interposed between said first screw thread portion and said tapered transition portion having said forming means formed thereon.

4,966,025

HORIZONTALLY OPPOSED-DIE TYPE EDGING PRESS

Mitsuhiko Ichikawa; Bunpei Masuda; Nobuhiro Tazoe; Masajiro Yoshida, and Kenichi Ide, all of Yokohama, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Filed Sep. 21, 1989, Ser. No. 410,616
Claims priority, application Japan, Nov. 2, 1988, 63-278227
Int. Cl.[5] B21J *7/32*
U.S. Cl. 72—184 3 Claims



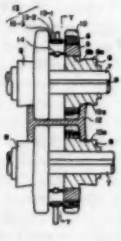
1. A horizontally opposed-die type edging press comprising slides each having a die, said slides being disposed to sandwich a slab transportation line, bearing boxes disposed on a side of the corresponding slide remote from said line and adapted to move in a direction of width of a slab to be forged, a crankshaft supported by said bearing boxes, a connecting rod for connecting an eccentric portion of said crankshaft with the corresponding slide, a parallel displacement mechanism for moving each of said slides in the direction in parallel with said line, a width setting device disposed on a side of said bearing boxes remote from said line and adapted to cause the bearing boxes to displace in the direction of width of the slab to be forged, means for pressing said bearing boxes to said width setting device, and a gear box on an extension of said crankshaft and adapted to be displaced by said width setting device in accordance in speed and direction with the displacement of said bearing boxes and a member for guiding the displacement of said gear box.

4,966,026

EDGING ROLL FOR USE IN MAKING SECTIONS HAVING FLANGES

Taneharu Nishino, Sakai, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

PCT No. PCT/JP87/01024, § 371 Date Aug. 18, 1988, § 102(e) Date Aug. 18, 1988, PCT Pub. No. WO88/04965, PCT Pub. Date Jul. 14, 1988
PCT Filed Dec. 24, 1987, Ser. No. 243,309
Claims priority, application Japan, Dec. 29, 1986, 61-315648
Int. Cl.[5] B21B *1/08*
U.S. Cl. 72—224 4 Claims



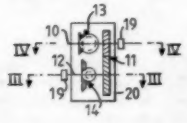
1. An edging roll for use in making shaped steel having flanges, characterized in that flange rolls (**8**) each having a flange rolling portion (**8***a*) and a sleeve mounting portion (**8***b*) are disposed right and left on a main shaft (**7**) rotatably together therewith, an inner eccentric sleeve (**5**) is disposed on the outer periphery of the sleeve mounting portion (**8***b*) capable of rotating and setting at a required position thereon, an outer eccentric sleeve (**6**) is on the outer periphery of the inner eccentric sleeve (**5**) capable of rotating and setting at a required position thereon, and a web guide roll (**10**) is on the outer periphery of the outer eccentric sleeve (**6**) rotatably therealong.

4,966,027

WIRE-ROD BLOCK

Kurt Danielsson, Smedjebacken, Sweden, assignor to Morgardshammar AB, Smedjebacken, Sweden

Filed Feb. 27, 1989, Ser. No. 315,573
Claims priority, application Sweden, Mar. 11, 1988, 8800880
Int. Cl.[5] B21B *35/00*
U.S. Cl. 72—249 3 Claims



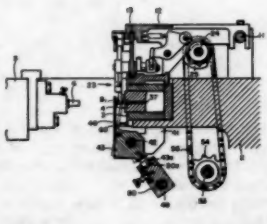
1. A wire-rod block forming part of a wire rolling line and including two roll rings between which the wire rod is rolled, an input drive shaft and a gearing which is effective in transmitting the drive torque of the drive shaft to the rings, characterized in that the input drive shaft (**10**) drives one (**15**) of the roll ring shafts directly, over a first bevel gear (**13**) and also an output shaft (**12**), over a gear (**11**), said output shaft in turn driving the shaft (**17**) of the other roll ring, over a second bevel gear (**14**), wherein the transmission ratio of the gearing and the bevel gears are such that the roll rings will rotate at mutually the same peripheral speed, and wherein each of said input drive shaft (**10**) and output shaft (**12**) comprises a shaft coupling (**19**), whereby said input drive shaft (**10**) is adapted to be driven by the output shaft of an adjacent upstream wire-rod block and said output shaft (**12**) is adapted to drive the input drive shaft of an adjacent downstream wire-rod block.

4,966,028

MULTI-STAGE COLD FORGING MACHINE

Yoshikazu Sakamura, Uebonmachi, and Sumitada Higuchi, Motokurihashi, both of Japan, assignors to Kabushiki Kaisha Sakamurakikai Seisakusho, Osaka, Japan

Filed Nov. 14, 1988, Ser. No. 270,691
Int. Cl.[5] B21J *13/10*
U.S. Cl. 72—361 1 Claim



1. A multi-stage cold forging machine having a plurality of

forging stages through which a metal blank is transferred and progressively refined, the machine comprising:

a die block having a plurality of dies spaced at equal intervals to form a row of dies;

a ram carrying a number of hammers corresponding to that of the dies, the ram being reciprocally moved to and from the die block, the ram being power driven through a crankshaft;

a chuck block carrying a number of chucks corresponding to that of the dies, the chucks being adapted to clamp a forged blank and transfer it to the next stage, the chuck block being reciprocally moved along the row of dies;

a chuck driving shaft for moving the chuck block reciprocally by a distance between adjacent dies, thereby enabling the chucks to transfer a clamped blank between adjacent dies, the chuck driving shaft being rotated by the ram driving crankshaft;

a chuck operating shaft for opening and closing the chucks synchronously with the advance and withdrawal of the ram, the chuck operating shaft being connected to the ram driving crankshaft; and

a parts forming aid unit having a plurality of pins for aiding one of the chucks to engage a blank to be removed from one of the plurality of dies and for inserting a blank into one of the plurality of dies after release by one of the chucks, wherein the aid unit comprises a sliding block slideably and rotatively carried on a shaft extending along the row of the dies, a driving means for moving the sliding block along the shaft by the distance between adjacent dies between an initial position with at least one of the pins positioned between adjacent dies and a final position with pins in front of a respective die, synchronously with the rotation of the chuck driving shaft so that the pins are reciprocally moved between the initial and final positions with the pins out of the way of hammers of the ram as the ram is moved towards the die block, and a rocking unit for rotating the sliding block about the shaft to synchronously move the pins toward and away from the dies through the operation of a cam effected by the rotation of the chuck operating shaft so that the pins protrude toward the dies and retain a blank therefrom until it is clamped by the respective chucks for removal and insert a blank into one of the plurality of dies after transfer and release by one of the chucks when the sliding block is positioned in the final position.

4,966,029

METHOD OF BENDING A WORKPIECE TO A PREDETERMINED BENDING ANGLE

Vaclav Zbornik, Oftringen, Switzerland, assignor to Haemmerle AG, Switzerland

Filed Apr. 14, 1989, Ser. No. 339,074
Claims priority, application Austria, Apr. 25, 1988, 1046/88
Int. Cl.[5] B21C *37/02*
U.S. Cl. 72—379.2 **2 Claims**

1. A method of bending a workpiece to a predetermined bending angle by means of a bending apparatus which comprises a movable bending bar resiliently supported on a pressurized fluid cushion and a fixed bottom die having a die bottom member, the height position thereof being adjustable in accordance with the bending angle to be achieved, the method comprising the successive steps of:

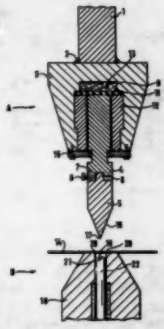
adjusting said die bottom member to a height position which corresponds to a first nominal bending angle greater than said predetermined bending angle;

inserting said workpiece to be bent between said moveable bending bar and said fixed bottom die and displacing said bending bar towards said bottom die until the leading edge of said workpiece abuts against the top of said die bottom member, thereby continuously bending said workpiece to said first nominal bending angle;

reducing the pressure in said fluid cushion on which said movable bending bar is supported, thereby allowing said workpiece to resiliently move back into its slacked condition;

measuring the actual bending angle of said workpiece when it is in its slacked position and comparing the value of said first actual bending angle with the value of said first nominal bending angle;

re-adjusting said die bottom member to a height position corresponding to a second nominal bending angle having the value of said predetermined bending angle minus said calculated difference between said measured first actual bending angle and said first nominal angle;



again exerting a bending force on said workpiece to be bent until the leading edge of said workpiece abuts against the top of said die bottom member thereby further bending said workpiece to said second nominal bending angle; and

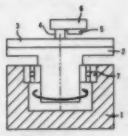
releasing the bending force exerted on said workpiece bent to second nominal bending angle, thereby allowing said workpiece to resiliently move back into its slacked condition in which it is bent to said predetermined bending angle.

4,966,030

PIN-ON-DISK TYPE WEAR TESTING DEVICE

Takashi Kobayashi; Eiji Suzuki, both of Osaka, and Yoshitaka Uchiyama, Toyama, all of Japan, assignors to Starlite Co., Ltd., Osaka, Japan

Filed Oct. 5, 1989, Ser. No. 417,642
Claims priority, application Japan, Oct. 11, 1988, 63-256335
Int. Cl.[5] G01N *3/56*
U.S. Cl. 73—7 **3 Claims**



1. A pin-on-disk type wear testing device in which a pin type testpiece is in contact with a rotating disk type testpiece under a constant load, the pin type testpiece sliding against the disk type testpiece along a given circular track thereon,

said pin-on-disk type wear testing device comprising: a pin type testpiece holder for holding the pin type testpiece in such a way as to move integrally therewith; and a non-contact type displacement gauge fixed to the pin type testpiece holder in such a way as to face the disk type testpiece, for detecting the relative displacement of the pin

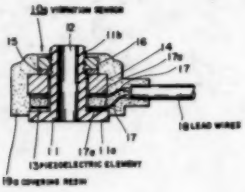
type testpiece holder with respect to the disk type testpiece, whereby the wear rate of the pin type testpiece with respect to time is measured.

4,966,031

VIBRATION SENSOR

Kazuo Mochizuki, Tokyo, Japan, assignor to TDK Corporation, Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,073
Claims priority, application Japan, Jan. 11, 1988, 63-1800
Int. Cl.[5] G01L *23/22*
U.S. Cl. 73—35 **3 Claims**



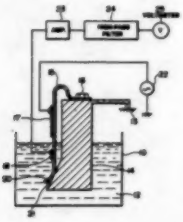
1. A nonresonant knocking sensor comprising:
a ceramic piezoelectric element having electrodes and a mass member, whereby forming a seismic system;
a base member shaped in the form of a sleeve with a structure for installation on an object the knocking of which is to be measured;
means for mounting said piezoelectric element and said mass member onto the periphery of said base member;
means for tightening said piezoelectric element and said mass member to said base member;
lead wires connected to said electrodes extending away therefrom; and
polyamide resin casing integrally encasing said piezoelectric element, said mass member, said tightening means and a portion of the lead wires.

4,966,032

INSTRUMENT FOR TESTING LUBRICATING OIL

Kiyoshi Takeuchi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed May 30, 1989, Ser. No. 357,886
Claims priority, application Japan, Jun. 2, 1988, 63-72718
Int. Cl.[5] G01N *33/28*
U.S. Cl. 73—64 **18 Claims**



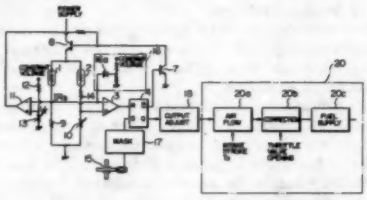
1. An instrument for testing a lubricating oil, comprising;
supporting means comprising a base member having a contact surface adapted to be immersed in said lubricating oil,
friction means comprising a vibration member having a friction portion abutting on said contact surface,
driving means for causing said vibration member to vibrate, and
sensing means for sensing a vibration caused by a friction between said friction portion and said contact surface, and producing a sensor output signal.

4,966,033

AIR FLOW METERING APPARATUS FOR INTERNAL COMBUSTION ENGINES

Yutaka Nishimura; Minoru Ohsuga, and Yoshishige Ohyama, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 13, 1989, Ser. No. 365,552
Claims priority, application Japan, Jun. 15, 1988, 63-145735; Jul. 9, 1988, 63-170017; Aug. 26, 1988, 63-111176[U]
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—118.2 **19 Claims**



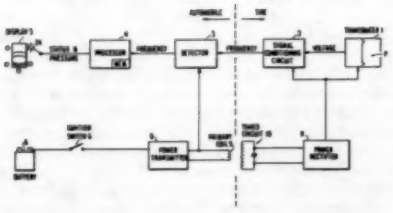
1. In an air flow metering apparatus for an internal combustion engine in which heating current supplied to a hot-wire air flow meter for detection of engine suction air flow rate is made intermittent in synchronism with the rotation of said engine so as to directly generate a flow rate detection signal in the form of a pulse width signal, the improvement which comprises computing means for generating correction data using variables including the rotation period of said engine and the opening rate of a suction air flow control means, and means for correcting air flow data obtained from said pulse width signal on the basis of said correction data.

4,966,034

ON-BOARD TIRE PRESSURE INDICATING SYSTEM PERFORMING TEMPERATURE-COMPENSATED PRESSURE MEASUREMENT, AND PRESSURE MEASUREMENT CIRCUITRY THEREOF

Ditmar H. Bock, Hamburg, and John M. Grace, Buffalo, both of N.Y., assignors to Schrader Automotive, Inc., Nashville, Tenn.

Continuation-in-part of Ser. No. 187,129, Apr. 28, 1988, abandoned. This application Mar. 29, 1989, Ser. No. 330,386
Int. Cl.[5] B60C *23/02*; G01L *7/08, 9/04, 23/04*
U.S. Cl. 73—146.5 **25 Claims**



1. In a vehicle comprising at least one wheel and a chassis to which said at least one Wheel is rotatably attached, a system for communicating temperature-compensated tire pressure from said at least one wheel to said chassis, said system comprising:
first energy transmitting means (9), mounted on said chassis, for transmitting first energy of a first predetermined frequency;

first energy receiving means (10), mounted on said at least one wheel, for receiving said first energy;

tire pressure signal generating means (1,2), mounted on said at least one wheel and responsive to pressure of a tire mounted on said at least one wheel, for generating a tire pressure signal;

constant current applying means (A1) for applying a constant current to said tire pressure signal generating means;

voltage polarity reversing means (A2, A3) for reversing polarity of voltage applied to said tire pressure signal generating means;

wherein said tire pressure signal generating means comprises a piezoresistive bridge, said constant current applying means and said voltage polarity reversing means enabling compensation for temperature drift, to produce a temperature-compensated tire pressure signal; and

wherein said temperature-compensated tire pressure signal is transmitted by said first energy receiving means to said first energy transmitting means, and alters operation of said first energy transmitting means, so as to communicate said signal from said at least one wheel to said chassis;

said system further comprising indicating means (5) for processing said temperature-compensated tire pressure signal to provide information indicative of said temperature-compensated tire pressure within said vehicle.

4,966,035

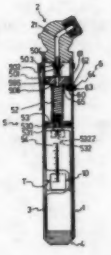
TIRE PRESSURE GAUGE

Tien-Tsai Huang, No. 4, Lane 30, Wu-Chang St., Pan-Chiao City, Taiwan

Filed Jan. 25, 1990, Ser. No. 470,151

Int. Cl.[5] B60C *23/02*; G01L *7/16*

U.S. Cl. 73—146.8 **3 Claims**



1. A pressure gauge comprising:

an elongated outer casing having a first end, an opposite second end, a first accommodating portion adjacent to said first end, a remaining second accommodating portion adjacent to said second end, and a window adjacent to said first accommodating portion,

a chuck connected to said second end of said outer casing and having an air inlet;

a check valve provided in said air inlet;

a transparent inner casing fixed in said first accommodating portion;

a piston member provided movably in said second accommodating portion and sealingly contacting the inner surface of said outer casing;

an elongated scale member movably disposed in said inner casing and having one end connected to said piston member; and

a spring member provided in said second accommodating portion and biasing said piston member away from said first accommodating portion.

4,966,036

AIR FLOW RATE METER

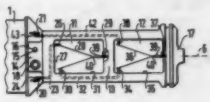
Juergen Woersinger, Maulbronn, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 29, 1989, Ser. No. 459,177

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906833

Int. Cl.[5] G01F *1/68*

U.S. Cl. 73—204.22 **4 Claims**



1. An air flow rate meter for measuring the aspirated air mass of internal combustion engines, having a substrate body extending transversely to an air flow direction and made of plastic, which has a first substrate opening extending parallel to the air flow direction, in which a first hot wire is disposed in a V-shape and retained by support points so that each of its ends is connected to a separate support point, said first hot wire further being formed with a loop via intersecting wire segments which are electrically conductively connected together, said first hot wire retained between its ends by means of at least one middle/support point that protrudes through the loop, a second substrate opening being provided adjoining the first substrate opening in the substrate body in a direction corresponding to a longitudinal axis of the substrate body and being separated from the first substrate opening by a web of the substrate body and likewise extending parallel to the air flow direction, a second hot wire being disposed in said second substrate opening and electrically connected to the first, said second hot wire also being disposed between support points in a V shape so that each of its ends is connected to one each support point, said second hot wire further being formed with a loop via intersecting wire segments which are electrically conductively connected together, said second hot wire retained between its ends via at least one middle support point protruding through the loop, and transversely to the substrate openings, the substrate body has a bearing surface on which a frame body made of plastic rests, said frame body having a first frame opening in alignment with the first substrate opening and a second frame opening in alignment with the second substrate opening, the first frame opening and the second frame opening being separated by a web of the frame body, a first electrically conductive connection wire and a second electrically conductive connection wire are embedded in the frame body the first connection wire protruding out of the frame body, with a first closure end which is electrically conductively connected to a first connection lug protruding from the substrate body, said first connection wire having a support point end bent into a hook shape further protruding into the first frame opening and the first substrate opening where it is electrically conductively connected to one end of the first hot wire the other end of the first hot wire being electrically conductively connected to a first support point end of a linking wire, said first support point end being bent into a hook shape so as likewise to protrude into the first frame opening and the first substrate opening said linking wire being embedded in the frame body so as to protrude with a second support point end bent into a hook shape into the second frame opening and the second substrate opening where it is electrically conductively connected to one end of the second hot wire, the other end of the second hot wire being electrically conductively connected to a support point N of the second connection wire, this support point N being bent into a hook shape so as to protrude into the second frame opening and the second substrate opening, the second connection wire being arranged to protrude from the frame body with

a second connection end, which end is electrically conductively connected to a second connection lug protruding from the substrate body.

4,966,037

CANTILEVER SEMICONDUCTOR DEVICE

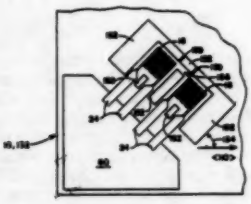
John F. Sumner, Edina; Robert G. Johnson, Minnetonka, and Robert E. Higashi, Minneapolis, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 531,130, Sep. 12, 1983, abandoned. This application Oct. 1, 1985, Ser. No. 782,188

The portion of the term of this patent subsequent to Jan. 30, 2005, has been disclaimed.

Int. Cl.[5] G01F *1/68*

U.S. Cl. 73—204.26 **59 Claims**



1. An integrated semiconductor device, comprising:

a semiconductor body having a depression formed by an anisotropic etch applied to a first surface of the body, the semiconductor body comprising (100) silicon having a (100) plane and a <100> direction, the first surface of the semiconductor body being substantially parallel to the (100) plane; and

thin film dielectric member means comprising a static electric element, the member means having a predetermined configuration suspended over the depression, the predetermined configuration being oriented at a non-zero angle to the <100> direction, the member means being connected to the first surface so that the predetermined configuration is cantilevered over the depression, the depression opening to the first surface around at least a portion of the predetermined configuration, the depression, the opening, and the member means providing substantial physical and thermal isolation between the element and the semiconductor body.

4,966,038

ULTRASONIC MICROSCOPE

Mitsuo Sakai, Hachioji; Koichi Karaki, Tokyo, and Yasuo Sasaki, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,644

Claims priority, application Japan, Jul. 1, 1988, 63-162713

Int. Cl.[5] G01N *29/04*

U.S. Cl. 73—606 **8 Claims**

1. An ultrasonic microscope comprising:

an acoustic lens;

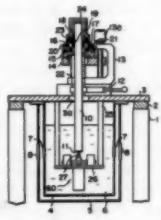
accoustic lens supporting means;

sample supporting means for supporting a sample to face the acoustic lens; and

drive means for two-dimensionally shifting the acoustic lens supporting means and the sample supporting means relative to each other, thereby setting a scanning region, and for causing the sample to be scanned to obtain an ultrasonic image thereof;

wherein said drive means includes first shift means for shifting the acoustic lens supporting means in a first direction by means of magnetic force, and second shift means for shifting the acoustic lens supporting means in a second direction, perpendicular to the first direction, by means of magnetic force;

wherein said first and second shift means each include a magnetic field generating coil fixed to the acoustic lens supporting means, a power circuit for supplying an electric current to the coil, and magnetic means for generating magnetic fields which, in conjunction with a magnetic field generated when an electric current flows through the coil, cause the coil to shift in the first and second directions, individually;



wherein said power circuit includes a first power source means for providing an electric signal for displacing the acoustic lens supporting means to a designated position within said scanning region, a second power source means for providing an electric signal to produce scanning of said sample about said designated position, an adder for adding the electric signals from the first and second power source means, and means for delivering the resulting signal to the coil to cause said drive means to displace the acoustic lens supporting means to said designated position and to produce scanning.

4,966,039

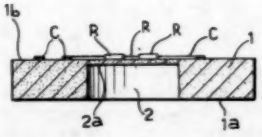
ELECTRICAL FORCE AND/OR DEFORMATION SENSOR, PARTICULARLY FOR USE AS A PRESSURE SENSOR

Roberto Dell'Acqua, Pavia, Italy, assignor to Marelli Autronica S.p.A., Milan, Italy

Continuation of Ser. No. 192,414, May 10, 1988, abandoned. This application Apr. 12, 1990, Ser. No. 508,513

Int. Cl.[5] G01L *1/22, 7/08, 9/06*

U.S. Cl. 73—727 **6 Claims**



1. An electrical force and/or deformation sensor, particularly but not exclusively for use as a pressure sensor, comprising a support structure of ceramic material including an element which is resiliently deformable by a force or pressure to be measured, at least one piezoresistive sensitive element which is constituted by a thick-film resistor deposited by silk screen printing on the support structure, and electrical conductor means connected to the at least one sensitive element and adapted to enable its connection to supply and processing circuit means, wherein the support structure is constituted by a rigid plate in one face of which is formed a recess having a thin bottom wall which is resiliently deformable under the action of a force or pressure to be measured, and wherein said at least one sensitive element is applied to the other face of the plate in correspondence with the bottom wall of the recess, the

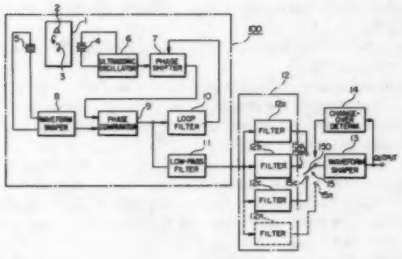
conductor means comprising conductive strips deposited by silk screen printing on the other face of the plate.

4,966,040

KÁRMÁN VORTEX FLOWMETER WITH SIGNAL WAVEFORM SHAPER CIRCUIT

Katsuhiko Okmae, Himeji City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,206
Claims priority, application Japan, Apr. 19, 1988, 63-97869
Int. Cl.[5] G01F *1/32*
U.S. Cl. 73—861.22 **5 Claims**



1. A vortex flowmeter for measuring an amount of flow of a fluid comprising:

vortex generation frequency detector means for detecting a frequency of generation of vortices in a flow of the fluid by an obstruction positioned in the flow, said vortex generation frequency detector means outputting an electrical signal including an essentially sinusoidal signal component having a frequency corresponding to the frequency of vortex generation;

a filter group coupled to an output of said vortex generation frequency detector means and including a plurality of filters having a gradation of pass bands which covers a whole range of a variation of the frequency of said signal component of said electrical signal;

waveform shaper circuit means, coupled to an output of said filter group, for forming and outputting a pulse-shaped signal having a frequency corresponding to the frequency of said signal component of said electrical signal;

change-over switching circuit means, inserted between the output of said filter group and an input of said waveform shaper circuit means, for selectively coupling one of the filters of said filter group to an input of said waveform shaper circuit; and

filter change-over determination means, coupled to an output of said waveform shaper circuit means, for controlling said change-over switching circuit means, in response to the pulse-shaped signal outputted from said waveform shaper circuit means, in such a manner that a filter in the filter group having a frequency band corresponding to a frequency of said pulse-shaped signal is coupled to the input of said waveform shaper circuit through said change-over switching circuit means, wherein said waveform shaper circuit means comprises:

peak level holding circuit means, coupled to the output of said filter group through said change-over switching circuit means, for holding a highest level of an output signal of said filter group which occurs after said peak level holding circuit means is set into a holding operation;

bottom level holding circuit means, coupled to the output of said filter group through said change-over switching circuit means, for holding a lowest level of an output signal of said filter group which occurs after said bottom level holding circuit means is set into a holding operation;

positive level shift circuit means, coupled to the output of said filter group through said change-over switching circuit means, for shifting a level of the output signal of said filter group by a predetermined positive amount, and outputting the positively shifted signal therefrom;

negative level shift circuit means, coupled to the output of said filter group through said change-over switching circuit means, for shifting a level of the output signal of said filter group by a predetermined negative amount, and outputting the negatively shifted signal therefrom;

first comparator means, coupled to outputs of said peak level holding circuit means and said positive level shift circuit means, for outputting a pulse when a level held by said peak level holding circuit means crosses with a level of the positively shifted signal outputted from said positive level shift circuit;

second comparator means, coupled to outputs of said bottom level holding circuit means and said negative level shift circuit means, for outputting a pulse when a level held by said bottom level holding circuit means crosses with a level of the negatively shifted signal outputted from said negative level shift circuit;

bistable multivibrator circuit means, having a pair of inputs coupled to outputs of said first and second comparator means, respectively, for outputting a pulse-shaped signal taking a first and a second level, wherein the pulse-shaped signal outputted from said bistable multivibrator circuit means goes to a first level in response to a pulse outputted from said first comparator means, and to a second level in response to a pulse outputted from said second comparator means;

peak level resetting means, coupled to an output of said bistable multivibrator means, for resetting a level held by said peak level holding circuit means each time after the level held by said peak level holding circuit means crosses with the level of the positively shifted signal outputted from the positive shift circuit; and

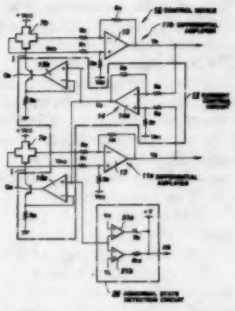
bottom level resetting means, coupled to an output of said bistable multivibrator means, for resetting a level held by said bottom level holding circuit means each time after the level held by said bottom level holding circuit means crosses with the level of the negatively shifted signal outputted from the negative shift circuit.

4,966,041

DISPLACEMENT DETECTION DEVICE

Hiroya Miyazaki, Tamamura, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,072
Claims priority, application Japan, Dec. 8, 1987, 62-308650
Int. Cl.[5] G01L *3/10*; G01R *33/06*; H01L *43/06*
U.S. Cl. 73—862.33 **4 Claims**



1. A displacement detection device for a linear displaceable movable object comprising:

a pair of magnets magnetized with opposite polarities to

each other and arranged adjoining each other in a direction of linear displacement of the movable object;

a first and a second Hall element disposed at a position opposing said pair of magnets and arranged in the direction of displacement with a predetermined interval therebetween, said pair of magnets being movable relative to said first and said second Hall element with the linear displacement of said movable object; and

a current control circuit for supplying said first and said second Hall element with an input current corresponding to a difference value between output voltages of said first and said second Hall element to correct the rate of change of the output voltage of each of said first and second Hall elements with respect to the linear displacement of said movable object to thereby maintain the difference value at a predetermined value representing a normal condition of said first and said second Hall element.

4,966,042

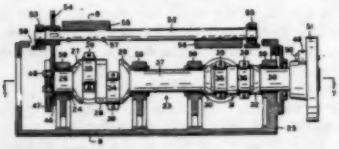
BALANCED RECIPROCATING MACHINES

Arthur E. Brown, R.D. #1, Box 1107, Lake George, N.Y. 12845

Filed Feb. 6, 1989, Ser. No. 306,835

Int. Cl.[5] F16F *15/26*; F16H *21/22*

U.S. Cl. 74—44 **22 Claims**



1. In a reciprocating compressor machine, the combination of: a frame structure, a crankshaft mounted on main bearings for rotation in the frame structure, said crankshaft having four throws with four crankpins,

the first said crankpin being located near one end of the crankshaft, the second said crankpin being located further along the crankshaft, the third said crankpin being located still further along the crankshaft, the fourth said crankpin being located toward the other end of the crankshaft,

said first and second crankpins being angularly located about the axis of the crankshaft at substantially 180 degrees from each other, said second and third crankpins being angularly located about the axis of the crankshaft at substantially 90 degrees from each other, said third and fourth crankpins being angularly located about the axis of the crankshaft at substantially 180 degrees from each other,

four crosshead guides fastened to said frame structure,

a first crosshead, a second crosshead, a third crosshead, and a fourth crosshead, each said crosshead being reciprocable in a respective said crosshead guide, at least four connecting rods, each said connecting rod being joined to a respective crosshead with an articulative joint such as a wrist pin, each said connecting rod interconnecting a respective said crankpin to a respective said crosshead for respective rotary and reciprocative motion,

said first and second crossheads being mounted in opposed relation on opposite sides of said crankshaft, said third and fourth crossheads being mounted in opposed relation on opposite sides of said crankshaft,

said first and second crossheads being adapted to arrive at the outer ends of their reciprocative strokes at substantially the same time, said third and fourth crossheads being adapted to arrive at the outer ends of their reciprocative strokes at substantially the same time,

said first crosshead and said third crosshead being mounted on one side of said crankshaft, said second crosshead and said fourth crosshead being mounted on the other side of said crankshaft,

a first piston, a second piston, a third piston, and a fourth piston, each said piston being attached to a respective crosshead and reciprocable therewith,

said first and second crossheads being offset from each other because their respective said crankpins are axially spaced along the crankshaft, said third and fourth crossheads being offset from each other because their respective said crankpins are axially spaced along the crankshaft,

said first and second crossheads (with pistons attached) having the usual primary inertia force couples and secondary inertia force couples caused by said offset locations, said third and fourth crossheads (with pistons attached) having the usual primary inertia force couples and secondary inertia force couples caused by said offset locations, said secondary inertia force couples (in each case) being additionally caused by the finite lengths of said connecting rods,

and wherein the improvements comprises the following in combination:

the total number of functioning full size said connecting rods in said compressor machine being exactly four, the total number of functioning full size said crossheads in said compressor machine being exactly four,

the use of four connecting rods and four crossheads all located and timed (as specified in this claim) causes the two said secondary inertia force couples to act in opposite directions from each other (at the same time) and therefore counterbalance each other,

at least two counterweights fastened to said crankshaft and rotatable therewith,

at least two balance weights mounted for rotation relative to said frame structure, said balance weights having their axes of rotation offset from and substantially parallel to the axis of said crankshaft, positive tooth means for driving said balance weights at the same RPM as said crankshaft and in the opposite direction of rotation to that of the crankshaft,

and said counterweights on the crankshaft and said offset balance weights serving to balance both of said primary inertia force couples.

4,966,043

CRANK DRIVE

Heinz Frey, Hirtenhofstrasse 13, CH-6005 Luzern, Switzerland

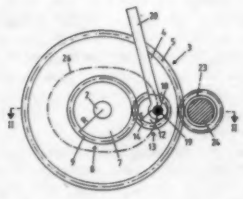
PCT No. PCT/CH88/09075, § 371 Date Nov. 21, 1988, § 102(e) Date Nov. 21, 1988, PCT Pub. No. WO88/08095, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 11, 1988, Ser. No. 295,248

Claims priority, application Switzerland, Apr. 13, 1987, 1414/87

Int. Cl.[5] F16H *21/30, 21/20*; F02B *75/32*

U.S. Cl. 74—52 **5 Claims**



1. A crank drive comprising;

a crank with a crank turning axis;

a sun wheel having a central axis arranged coincident with said crank turning axis and being rotationally arrestable said sun wheel having external teeth, said sun wheel having a radius R;

a planetary wheel mounted rotatably on said crank and

having a planetary turning axis arranged at a distance from said crank turning axis;

a means for providing a continuous rotational interengagement between said sun wheel and said planetary wheel including teeth provided on said planetary wheel which intermesh with said sun wheel external teeth, said planetary wheel having a radius r, said sun wheel having radius R substantially equal to two times the planetary wheel radius r;

a connecting rod with one end mounted rotationally to a rod axis pin provided on said planetary wheel at a distance X from said planetary turning axis, the ratio of the distance X (the eccentricity of the rod axis pin on said planetary wheel) to a distance Z between said crank turning axis and said planetary turning axis being less than or equal to 1/9.

4,966,044

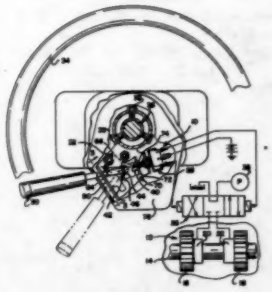
DIRECTIONAL CONTROL SYSTEM FOR A TRACTOR TRANSMISSION

Barry A. Bowman, Maplewood, Minn.; Stanley J. Jeziorski, Darien, Ill.; Francis A. Peterson, Clarinden Hills, Ill., and Ralph D. Price, Bolingbrook, Ill., assignors to J. I. Case Company, Racine, Wis.

Filed May 30, 1989, Ser. No. 347,174

Int. Cl.[5] F16H *59/10*

U.S. Cl. 74—335 **6 Claims**



1. A directional control system for positively engaging a mechanism in either of two modes of operation, said control system comprising:

controller means for engaging said mechanism in either mode of operation as a function of electrical signals received thereby;

electrical switch means for directing electrical signals to said controller means, said electrical switch means including a switch actuator movable between two operative positions to control the signals directed by said switch means to said controller means as a function of the operative position of said switch actuator; and

an operator controlled lever for controlling the operative position of said switch actuator and thereby the mode of operation of said mechanism, said lever being positively retained in either of two positions by an over-center arrangement including a support, a shaft rockable about a first axis in the support, with said lever being pivotally connected to said shaft about a second axis and extending through a slotted opening in a gate, said slotted opening in said gate defining at opposite ends thereof two spaced detents corresponding to the two modes of operation of said mechanism, said slotted opening being configured such that as said lever is moved between detents the lever is caused to move conjointly about both of said axes, resilient means connected to said support for positively retaining the lever in either of said two detents and to impede said lever from being inadvertently located between said two detents, and means responsive to movement of and for interconnecting an inner end of said lever to said switch means to allow relative movement therebetween such that extended movement of said lever between the detents results in movement of said switch actuator between operative positions thereby facilitating positive engagement of the mechanism and inhibiting inadvertent shifting of the mechanism between modes of operation.

4,966,045

POWERED SIX-WAY SEAT ADJUSTOR AND MECHANISMS THEREFOR

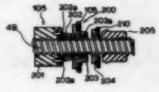
William J. J. Harney, Willowdale, Canada, assignor to Magna International Inc., Markham, Canada

Filed Jul. 12, 1988, Ser. No. 217,952

Claims priority, application Canada, Jul. 13, 1987, 541927

Int. Cl.[5] F16H *25/25*; B60T *7/12*; A47C *1/024*

U.S. Cl. 74—424.8 A **21 Claims**



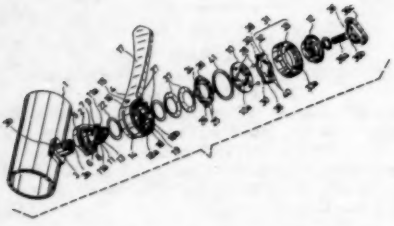
1. For use in conjunction with a lead screw, a load bearing structural assembly, the assembly comprising a threaded lead screw having a central axis, the lead screw having mounting means and anchor means affixed to one end thereof; the lead screw having mounted thereon a first drive nut having an opening therethrough, the first drive nut having a predetermined load bearing capacity, the circumference of the opening of the first drive nut having compatible threading with the lead screw; the structural assembly having a second drive nut having an opening therethrough the second nut affixed to the first drive nut, the second nut having a much greater predetermined load bearing capacity than the first drive nut and having threading disposed about the circumference of the opening compatible with the lead screw; the structural assembly having a collet having an interior and exterior, the collet in communication with the exterior surface of the second drive nut upon the interior of the collet, having an opening therethrough, having a transmission means affixed to the first drive nut and the collet, whereby the first drive nut is driven by the rotation of the lead screw when the first drive nut is subjected to loads less than or equal to its predetermined load bearing capacity and the second drive nut does not interfere with the movement of the first drive nut when the first drive nut is subjected to loads less than or equal to its predetermined load bearing capacity thereby driving the transmission means in a predetermined direction; whereby when the transmission means subjects a load upon the first drive nut in a direction along or parallel to the central axis of the lead screw, such load being greater than the predetermined load bearing capacity of the first drive nut, causing the first nut to fail, such load will also be subjected upon the collet which will further capture the second drive nut within the opening at the interior of the collet and force the second drive nut to clamp down on the lead screw sufficiently to prevent rotation of the lead screw and to pass the load from the transmission means to the collet, from the collet to the second drive nut, from the second drive nut to the lead screw, from the lead screw to the anchor means, and from the anchor means to the mounting means, thereby resolving the axial loading of the lead screw.

4,966,046

BICYCLE SPEED CHANGE LEVER ASSEMBLY

Koichi Tagawa, Kawachinagano, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan

Filed Jun. 5, 1989, Ser. No. 362,365
Int. Cl.[5] F16C *1/10*
U.S. Cl. 74—502.2 **20 Claims**



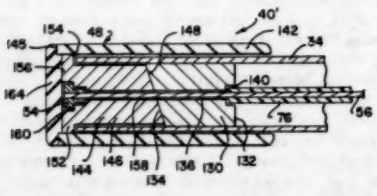
1. A bicycle speed change lever assembly comprising:
a support shaft;
a control lever pivotally supported by said support shaft and always subjected to a tension tending to pivot said lever in one direction, said lever including a boss portion having a bore for rotatably fitting around said support shaft, said lever further including an arm portion extending radially outward from said boss portion;
a click member substantially co-rotatable with said boss portion, said click member being formed with at least one arcuate series of clicking recesses;
at least one rolling element held by retainer means in facing relation to said series of clicking recesses, said retainer means being substantially non-rotatable relative to said support shaft;
backup means arranged for backing up said rolling element on one side of said retainer means away from said click member, said backup means being capable of providing a half-click mode wherein said backup means allows said rolling element to limitatively retreat from said series of clicking recesses while also preventing said rolling element from retreating out of clicking engagement with said series of clicking recesses; and
friction imparting means capable of imparting to said boss portion of said lever a rotational friction enough to overcome said tension.

4,966,047

HANDLEBAR-MOUNTED CABLE CONTROL

Alwin Krauer, 111 E. Chestnut, Apt. 18H, Chicago, Ill. 60611, and Richard P. Frueh, Chicago, Ill., assignors to Alwin Krauer, Chicago, Ill.

Division of Ser. No. 130,096, Dec. 7, 1987, abandoned. This application Mar. 23, 1989, Ser. No. 327,758
Int. Cl.[5] G05G *11/00*; F16C *1/10*
U.S. Cl. 74—502.2 **9 Claims**



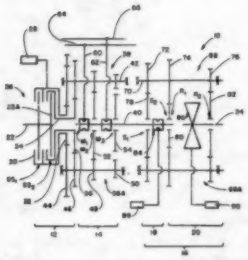
1. A handlebar-mounted cable control for a bicycle brake cable or the like, comprising:
a cable fitting having a throughbore, a first end and a second angled end, said fitting being fixed within an open end of a handlebar so that said angled end faces the open handlebar end;
a handle member including a tubular body portion configured to telescopically slide over the open end of the handlebar and to coaxially rotate thereabout, said body portion having an outer end spaced from the open handlebar end;
an insert portion fixed within said body portion of said handle member and having a lug portion projecting into the interior of the handlebar, the lug portion having a throughbore and a first angled end being generally complementary with and configured to slidingly contact said angled end of said fitting;
said throughbores being generally coaxial, said insert portion having means for locking an end of the cable thereto;
where in coaxial rotation of said tubular body portion and said insert portion relative to said cable fitting in the handlebar causes axial displacement of said handle member from the end of the handle bar and exerts an axial pulling action on the cable as said angled end on said insert is rotatably reoriented relative to said angled end on said cable fitting.

4,966,048

MANUAL TRANSMISSION AND SHIFT CONTROL THEREFOR

Eugene R. Braun, Royal Oak, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 17, 1989, Ser. No. 394,897
Int. Cl.[5] F16H *3/02*
U.S. Cl. 74—745 **20 Claims**



1. A compound vehicular transmission providing at least sixteen forward speeds comprising:
a two-speed subsplitter input section (12);
a main transmission section (14) providing at least two forward speeds and one reverse speed connected in series with said input section;
a two-sPeed splitter section (18) connected in series with said main transmission section; and
a two-speed range section (20) connected in series with said splitter section.

4,966,049

SHIFT CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

Hiroshi Takahashi, Zushi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 14, 1989, Ser. No. 338,165
Claims priority, application Japan, Apr. 20, 1988, 63-95493
Int. Cl.[5] F02D *41/02*; G06G *7/70*
U.S. Cl. 74—866 **5 Claims**

1. A shift control system for an automatic transmission of a vehicle, comprising:

actuating means for shifting said automatic transmission in accordance with a shift control signal;

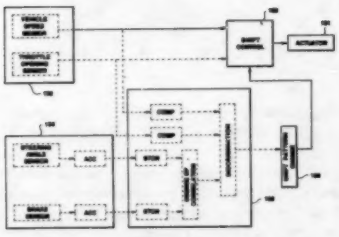
basic sensor means for sensing a vehicle speed of said vehicle;

basic controlling means for determning a desired shift position of said automatic transmission corresponding to said vehicle speed in accordance with a predetermined shift control mode, and producing said shift control signal to achieve said desired shift position;

additional sensor means comprising first additional sensing means for sensing a steering amount of said vehicle and producing a first data signal, and second additional sensing means for sensing a condition of a brake system of said vehicle and producing a second data signal;

discriminating means for determining a degree of correlation between said first and second data signals;

wherein said discriminating means comprises first storing means for storing a plurailty of values of said first data



signal obtained at time intervals, second storing means for storing a plurality of values of said second data signal obtained at time intervals, calculating means for determining said degree of correlation which is a correlation coefficient between said values stored in said first storing means and said values stored in said second storing means, deciding means for comparing said correlation coefficient with a predetermined coefficient value, and for producing a discrimination signal when said correlation coefficient is higher than said predetermined coefficient value, and first comparing means for comparing said vehicle speed with a predetermined speed level, and wherein said discriminating means produces said discrimination signal when said correlation coefficient is higher than said predetermined coefficient values and at teh same time saie vehicle speed is lower than said predetermined speed level; and

changing means for changing said shirt control mode of said basic controlling means when said discrimination signal is present.

4,966,050

CONTROL VALVE FOR REDUCING HARSHNESS OF ENGAGEMENT OF AN AUTOMATIC TRANSMISSION CLUTCH

Winfried Schulz, Pulheim; Johann Kirchhoffer, Cologne, and Kurt Graef, Pulheim, all of Fed. Rep. of Germany, assignors to Ford Motor Company, Dearborn, Mich.

Filed May 1, 1989, Ser. No. 345,913

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814547

Int. Cl.[5] B60K *41/16*

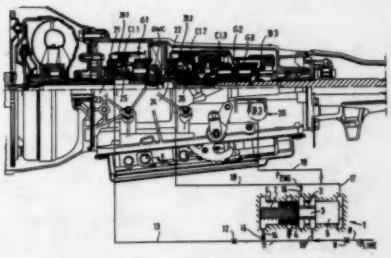
U.S. Cl. 74—867 **8 Claims**

1. In an automatic transmission mechanism having torque transmitting gear elements and clutch and brake means for controlling the relative motion of the gear elements to effect plural torque delivery paths from a driving member to a driven member;

said clutch and brake means including multiple fluid pressure operated servos with a servo apply pressure chamber and a spring release means for opposing the fluid pressure servo apply force for each servo, a pressure source and a fluid circuit connecting said pressure source with said servos;

the improvement comprising:

a control valve in said circuit having a valve chamber between said pressure source and at least one of said servos, said control valve having a pressure inlet port, an exhaust flow path and a pressure outlet port in said valve chamber, a movable valve element in said valve chamber, said valve element comprising fluid pressure regulating lands registering with said valve ports whereby one of said lands progressively restricts communication between said ports when said valve element moves in one direction, and another of said lands progressively restricting said exhaust



flow path when said valve element moves in the opposite direction, a regulated pressure feedback passage between said outlet port and one end of said valve element creating a pressure force urging said valve element in said one direction, said pressure inlet port being connected to said pressure source;

a fluid connection between an additional one of said servos and said pressure inlet port, said additional servo communicating with the other end of said valve element whereby the pressure developed in said additional servo communicates with said control valve to establish a pressure force on said valve element urging it in the opposite direction thereby modifying the pressure regulating characteristic of said valve.

4,966,051

EFFECT TONE GENERATING APPARATUS

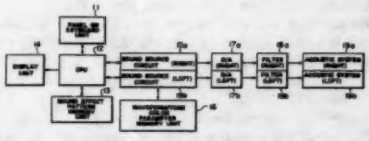
Youichiro Tajima, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 290,231

Claims priority, application Japan, Dec. 28, 1987, 62-335212; Dec. 28, 1987, 62-200343[U]; Dec. 28, 1987, 62-200344[U]; Dec. 28, 1987, 62-200815[U]; Dec. 28, 1987, 62-200816[U]

Int. Cl.[5] G10H *1/057, 1/46*

U.S. Cl. 84—663 **22 Claims**



10. An effect tone generating apparatus, comprising:

waveform generating means for generating a plurality of waveform data constituting an effect tone representing a scene;

pattern generating means for generating an effect tone pattern indicating a generation timing of the waveform data from said waveform generating means;

tone volume level control means for controlling a tone

volume level of the effect tone generated based on the plurality of waveform data each output from said waveform generating means at the timings determined by said effect tone pattern; and

designation means for designating a change mode of the tone volume level of said tone volume level control means.

4,966,052

ELECTRONIC MUSICAL INSTRUMENT

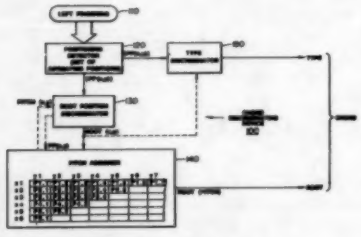
Kazuyoshi Shiraki, Fuse; Shiro Ishiguro, and Akinori Matsubara, both of Tachikawa, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1989, Ser. No. 343,032

Claims priority, application Japan, Apr. 25, 1988, 63-54539[U]; Nov. 25, 1988, 63-296227; Nov. 25, 1988, 63-296228; Nov. 25, 1988, 63-296229

Int. Cl.[5] G10H *1/38, 3/18*

U.S. Cl. 84—715 **51 Claims**



49. A chord discriminating apparatus for use in an electronic string instrument having a fingerboard and a plurality of strings with a plurality of tracks defined on said fingerboard to be associatable with said strings and extending along a lengthwise direction thereof, said apparatus comprising:

positioning detector means for detecting positions of finger positioning done on said tracks for chord designation;

pitch assigner means for respectively assigning pitches to a plurality of positions finger-positioned in said plurality of tracks;

root discriminator means, coupled to said positioning detector means and said pitch assigner means, for selecting one of said operation positions detected by said positioning detector means as a root designation position and designating, as a chord root, that pitch which is assigned to said root designation position by said pitch assigner means; and

type discriminator means, coupled to said positioning detector means, for discriminating a chord type from said operation positions.

4,966,053

MUSIC SYNTHESIZER WITH MULTIPLE MOVABLE BARS

John Dorsey, P.O. Box 1241, Pahoa, Hi. 96778

Continuation of Ser. No. 66,504, Jun. 26, 1987, abandoned, which is a continuation of Ser. No. 2,223, Feb. 12, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,460

Int. Cl.[5] G10G *1/00*; G10H *1/34*

U.S. Cl. 84—718 **4 Claims**

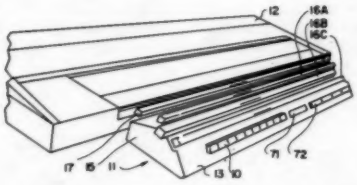
1. A variable control device accessory for a music synthesizer having a horizontally disposed keyboard, the variable control device being positionable in front of a keyboard of a music synthesizer comprising:

an elongated bar dimensioned approximately the width of a keyboard of a music synthesizer when in place being disposed at a plane approximately parallel therewith whereby at least one wrist of a player may rest on the elongated bar while the player fingers the keyboard in order to play the music synthesizer,

said bar being mounted on a frame which is mountable with respect to said music synthesizer and is adapted and constructed to be displaceable in pivotable movement and in horizontal slidable movement parallel to the front of the keyboard in response to the wrist action of the player

said bar having means for providing variable electric current to said music synthesizer in proportion to the pivotable displacement position of said bar whereby a selected parameter of the synthesizer is controllable,

said bar having means for providing variable electric current to said music synthesizer in proportion to the horizontal slidable movement of the bar whereby a selected parameter of the synthesizer is controllable,



means for arcuately returning said bar to a preselected normal position when said bar is released from a pivoted position,

at least one non-pivoting bar being positioned substantially parallel to said pivotable bar adapted and constructed to be slidable from side to side across the front of the keyboard by the wrist of a player,

said non-pivotable bar having means for providing variable electric current to said music synthesizer in proportion to the degree of sliding movement of said non-pivoting bar whereby a selected parameter of the synthesizer is controlled,

means for displaying positioning information for the pivotable bar and for the non-pivotable bar.

4,966,054

METHOD AND APPARATUS FOR THE MANUFACTURE OF A PUNCH HAVING A SHARP CUTTING EDGE

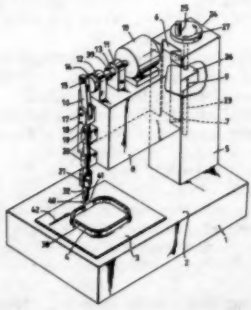
Rolf Beck, Leinfelden-Echterdingen, Fed. Rep. of Germany, assignor to Kocher & Beck OHG Gravieranstalt und Rotationsstanzenbau, Leinfelden-Echterdingen, Fed. Rep. of Germany

Filed Dec. 1, 1987, Ser. No. 127,249

The portion of the term of this patent subsequent to Jul. 18, 2007, has been disclaimed.

Int. Cl.[5] B21K *5/20*

U.S. Cl. 76—4 **16 Claims**



1. An apparatus for producing a punching tool having a sharp cutting edge, especially for label cutting apparatus, from

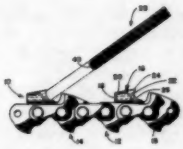
a punch body having a raised edge, comprising: a table for the punch body, a tool with a roof-shaped notch disposed above the table, drive means connected with the tool for automatically moving the tool back and forth in the direction of the table, and an adjusting mechanism for setting the height position of the tool above the table.

4,966,055

CHAIN SAW SHARPENING DEVICE

R. William Staggs, Orono, Minn., assignor to Northern Precision Twin Cities Inc., Long Lake, Minn.

Filed Sep. 6, 1989, Ser. No. 403,740
Int. Cl.[5] B23D *63/16*
U.S. Cl. 76—80.5 **9 Claims**



1. An apparatus for sharpening chain saw cutter teeth of the type which have a concave surface next to at least one cutting edge thereof, comprising:

a rigid metallic disc member having an outer circumferential edge, said disc member further having a central hole defined therein which adapts said disc member for mounting to a rotary tool; and

an abrasive coating on at least said outer circumferential edge of said disc member; said abrasive coating having a circumferential outer grinding surface which, when viewed in cross-section along a plane which is perpendicular to and radial to said disc member, has a curvature which is adapted to conform to the curvature of the concave surface in the chain saw cutter teeth, said outer circumferential edge of said disc member being, when viewed in cross-section along a plane which is perpendicular to and radial to said disc member, curved in the same shape as said grinding surface, whereby said abrasive coating may be formed to a constant thickness.

4,966,056

HAND-HELD STAPLE HOLDER

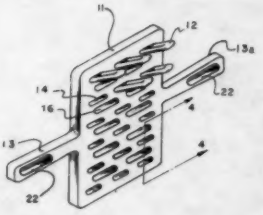
Glenn Miller, Lewisburg, Pa., assignor to Lemco Tool Corporation, Cogan Station, Pa.

Filed Dec. 4, 1989, Ser. No. 446,208
Int. Cl.[5] B25C *3/00*
U.S. Cl. 81—44 **9 Claims**

1. A hand-held mechanism for holding and supporting staples comprising;

a member having a substantially flat main section and at least one handle extending therefrom, said main section having a plurality of slots for holding staples having a first size, said slots holding said staples at an angle relative to the surface of said main section so as to facilitate their attachment to a workpiece; and

a plurality of second slots interspersed between said first slots for holding staples having a second size, said second slots holding said staples at an angle relative to the surface



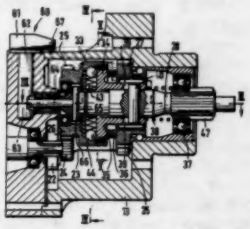
of said main section so as to facilitate their attachment to a workpiece.

4,966,057

POWER WRENCH

Wolfgang Koppatsch, St. Augustin, Fed. Rep. of Germany, assignor to Paul-Heinz Wagner, Fed. Rep. of Germany

Continuation of Ser. No. 290,407, Dec. 29, 1988, abandoned.
This application Apr. 9, 1990, Ser. No. 507,094
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801972
Int. Cl.[5] B25B *23/151*
U.S. Cl. 81—469 **23 Claims**



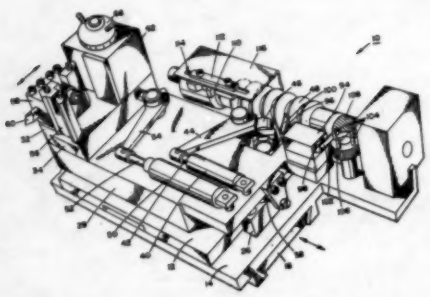
1. A power wrench comprising a drive coupling (14) having a distributing shaft (23) having first and second gears (24, 25) in respective driving relationship with a first drive gear (26) and a second drive gear (27), said first (26) and second (27) drive gears being driven at different rotational speeds by said distributing shaft first and second gears (24, 25), said first drive gear (26) being in driving relationship to a coupling member (32) through a first engaging coupling (33, 34) defined by first (33) and second (34) engaging coupling elements, said coupling member (32) being in driving relationship to an output shaft (28), said second drive gear (27) being in driving relationship to said coupling member (32) through a second engaging coupling (35, 36) defined by a third (35) and fourth (36) engaging coupling elements, said third (35) and fourth (36) engaging coupling elements being disposed for driving engagement between said second engaging coupling element (34) and said second drive gear (27), and means (38) for placing said first (33) and second (34) engaging coupling elements in driving relationship with each other up to a predetermined limiting rotational moment of said output shaft (28) at which said third (35) and fourth (36) engaging coupling elements come into driving relationship with each other.

4,966,058

AUTOMATIC THREADING DEVICE FOR LATHES

Michele Garombo, 91 Barstow St., Providence, R.I. 02909

Filed Sep. 30, 1988, Ser. No. 251,516
Int. Cl.[5] B23B *25/00, 3/28*
U.S. Cl. 82—154 **2 Claims**



1. A threading device for attachment to a lathe comprising:
(a) support means for fixedly mounting said threading device on said lathe;
(b) holding means for holding a cutting tool in position relative to a rotating part to be threaded;
(c) longitudinal carriage means, slideably mounted on said support means, for moving said cutting tool along a surface to be threaded of said rotating part;
(d) transversal carriage means upon which said holding means is fixedly mounted, slideably mounted on said longitudinal carriage means, for moving said cutting tool into said surface;
(e) rotating screw means, mounted on said support means, geared to rotate at a selected fixed ratio to the rotation of said rotating part;
(f) screw engaging means, fixedly mounted with respect to said longitudinal carriage means, adapted to engage said rotating screw means, thereby to move said longitudinal carriage means and thereby move said cutting tool along said surface to cut a groove therein;
(g) stop means fixedly mounted with respect to said screw means;
(h) variable stop means rotatably mounted with respect to said support means and geared to rotate at a selected fixed ratio with respect to said screw means, said variable stop means being adjustable to ensure that said cutting tool will engage the thread being cut in said rotating part; and
(i) control means fixedly mounted with respect to said longitudinal carriage means to control movement of said longitudinal carriage means and said transversal carriage means, said control means engaging said stop means when said cutting tool has reached the end of a threading pass and engaging said variable stop means when to initiate a threading pass.

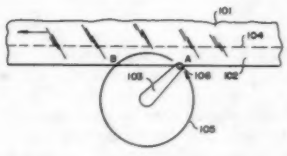
4,966,059

APPARATUS AND PROCESS FOR HIGH SPEED WATERJET CUTTING OF EXTENSIBLE SHEETING

Harry A. Landeck, Tolland, Conn., assignor to First Brands Corporation, Danbury, Conn.

Filed Sep. 22, 1987, Ser. No. 99,911
Int. Cl.[5] B26D *3/00*
U.S. Cl. 83—53 **28 Claims**

1. The process for high speed waterjet cutting about a single edge of a moving extensible sheeting material to effect repeated cuts in the material at about the edge, which comprises repeatedly
(i) passing an edge and a portion interior of the edge of the moving sheeting material over a solid support surface within a cutting area;
(ii) laterally moving a waterjet cutting means comprising a waterjet nozzle over the cutting area and the solid support to cross the edge of the moving sheeting material within the cutting area over the solid support;
(iii) providing a water passage opening, in and bounded by the solid support, which
(a) is in connected relationship with a water receptacle, and
(b) is opposite of the water nozzle and registered therewith to follow the nozzle while over the cutting area;
(iv) waterjet cutting the material at about the edge, within the cutting area, by waterjet cutting the material from a point at least within the edge to another point within the same edge;
(v) synchronizing the relationship of the water jetting from the waterjet nozzle such that as the water passes through the material, it is captured in the water passage and removed to the water receptacle;
(vi) removing the waterjet cutting means from a position over the moving sheeting material;
(vii) maintaining any removable piece that is formed by the waterjet cutting within the sheeting material until the sheeting material is removed from the cutting area; and
(viii) thereafter recovering the cut portion of the sheeting



material from the cutting area from which is separated any such removable piece.

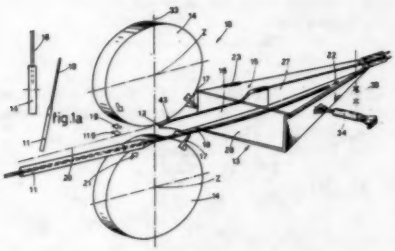
28. An apparatus for making a cut of at least a portion of the selvage of a thermoplastic sheeting which involves the repetitive arc cut in a continuous manner in a continuous supply of sheeting possessing a selvage portion and comprises:
(i) means for receiving a moving sheeting having edges onto the solid surface of a cutting area thereof;
(ii) means for passing an arc-directed waterjet cutter over the cutting area, over the area to be occupied by an edge of the sheeting;
(iii) means for causing the waterjet of the cutter to puncture the sheeting located in the cutting area and effect a cut of the edge as it passes onto the edge, and continue the cut until the waterjet is withdrawn from the sheeting within the cutting area;
(iv) means for withdrawing the waterjet cutter from the cutting area;
(v) means for holding the cut portion onto the solid surface of the cutting area until the withdrawal of the sheeting from the cutting area;
(vi) means for tracing within the support an open water removal passage corresponding to the position of the waterjet cutter over the sheeting which passage is enclosed by the support; and
(vii) means for withdrawing the cut portion of the sheeting from the cutting area.

4,966,060

VERY HIGH SPEED FLYING SHEARS

Alfredo Poloni, Ronchi Dei Legionari, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Jun. 15, 1988, Ser. No. 209,055
Claims priority, application Italy, Jun. 30, 1987, 83398 A/87
Int. Cl.[5] B23D 25/08
U.S. Cl. 83—105 27 Claims



1. Very high speed flying shears suitable for shearing rolling stock travelling even at a speed of more than one hundred meters per second, comprising:

two knives which counter-rotate relative to each other at a first predetermined speed at least during a shearing period and which define a shearing axis, each of said knives having a blade located at a circumferential position, each said blade extending substantially across the entire width of said knife;

a guide adapted to move essentially horizontally at a second predetermined speed to position the rolled stock at a desired lateral position relative to the shearing axis; and

a conveyor channel located downstream of the knives and having an inner dividing wall;

means for moving the guide essentially horizontally during the shearing period with the second predetermined speed being correlated with the first predetermined speed, and the lateral position being correlated to the circumferential position of the blades so that the guide is substantially parallel to the shearing axis while the guide moves at said second predetermined speed and the blades cut the rolled stock;

said inner dividing wall comprising a partition, said partition having an end portion which has a transversely rounded upper surface, said upper surface being located a predetermined distanced above said shearing axis, said predetermined distance being related to the diameter of the rolled stock;

said rounded upper surface extending essentially parallel to said shearing axis, and said end portion further comprising a frontal rounded tongue which extends at an angle down from said rounded upper surface and which defines a frontal point.

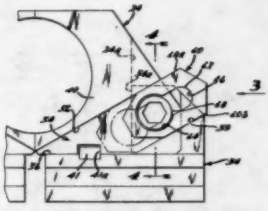
4,966,061

TUBE CUTTING APPARATUS

John F. Riera, 3689 Sandburg Dr., Troy, Mich. 48084; Billy J. Bielawski, Sr., 2270 Flanders Dr., Rochester Hills, and John J. Pavelec, 413 Dalton, Rochester, both of Mich. 48063

Filed Mar. 27, 1989, Ser. No. 328,950
Int. Cl.[5] B26D 11/00
U.S. Cl. 83—862 21 Claims

1. In an apparatus for severing a tubular workpiece and of the type including a base, a ram assembly vertically reciprocable relative to the base, a severing blade operated by said ram assembly to sever said workpiece, a pair of opposed complemental die jaws for clamping said workpiece therebetween, a pair of jaw holders for respectively mounting said die jaws on said base, and securing means for releasably securing said die jaws to jaw holders, the improvement being characterized in that the securing means operate independently of one another to secure each respective die jaw to its corresponding jaw holder, said jaw having a bore therethrough, a headed fastener having a body threadably connected to the jaw holder, and a keeper removably connectable to said fastener such that the jaw is sandwiched between said keeper and holder, said keeper



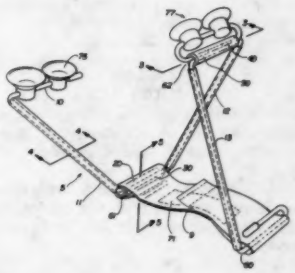
being connected to the fastener for relative transverse movement thereto between jaw and keeper releasing and retaining positions, whereby when the keeper is in its retaining position inward threadable adjustment of the fastener causes the head to move inwardly and thus drive the keeper and jaw into firm clamped engagement with the holder, contrariwise when the head moves outwardly and the keeper is free to move to its releasing position.

4,966,062

GUITAR SUPPORT APPARATUS

Robert H. Driggers, 302 Covewood Trial, Asheville, N.C. 28805, and David E. Stevenson, Box 8814, Asheville, N.C. 28814

Filed Feb. 9, 1990, Ser. No. 477,718
Int. Cl.[5] G10G 5/00
U.S. Cl. 84—327 3 Claims



1. A guitar support apparatus comprising:

a first leg having a first transverse extension at one end thereof and a second transverse extension parallel to said first transverse extension at the other end thereof;

a second leg having a third transverse extension at one end thereof and a fourth transverse extension parallel to said third transverse extension at the other end thereof;

a third leg having a fifth transverse extension at one end thereof and sixth transverse extension parallel to said fifth transverse extension at the other end thereof;

a first hinge joining said first leg and said second leg together by said second and third extension;

a second hinge joining said second leg to said third leg by said fourth and fifth transverse extensions;

an adjustable leg support strap connecting said first hinge and said sixth transverse extension; and

guitar contacting means on said first transverse extension and said second hinge.

4,966,063

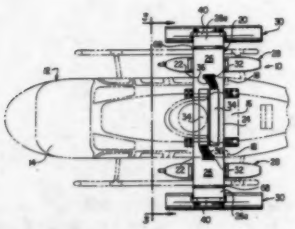
AIRCRAFT ARMAMENT APPARATUS

Paul H. Sanderson, 2019 Cripple Creek, Lewisville, Tex. 75067, and Richard C. Serkland, 1010 Meadowlake Dr., McKinney, Tex. 75069

Division of Ser. No. 144,873, Jan. 13, 1988, Pat. No. 4,893,545. This application Jan. 17, 1989, Ser. No. 297,943

Int. Cl.[5] F41A *23/02, 25/12*

U.S. Cl. 89—37.22 19 Claims



19. Armament apparatus securable to an aircraft having a cabin area, said armament apparatus comprising:

an elongated support plank member having outer end portions and a longitudinally central portion;

connecting means for anchoring said longitudinally central portion within said cabin area such that said outer end portions project outwardly from the aircraft; and

weaponry apparatus including:

a recoil shock absorbing gun mount secured to one of said outer end portions of said plank member,

a machine gun operatively secured to said gun mount, said machine gun having a bolt pin movable between safe and firing positions and having return spring means associated therewith for biasing said bolt pin toward said armed position, and

gun charging means secured to said machine gun and operative to selectively move said bolt pin between said safe and armed position.

4,966,064

ARMOURED CAR

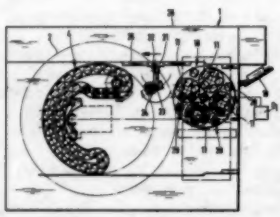
Gert Kaustrüter; Josef Jörg, both of Augsburg, and Helmut Janda, Schwabmünchen, all of Fed. Rep. of Germany, assignors to Kuka Wehrtechnik GmbH, Augsburg, Fed. Rep. of Germany

Continuation of Ser. No. 141,302, Jan. 6, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 467,752

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1987, 3701091

Int. Cl.[5] F41A *9/09*

U.S. Cl. 89—46 14 Claims



1. Armoured vehicle comprising a front wheel drive means, a vehicle hull, a turret means with a gun means, a first revolving magazine means for accommodating upright inserted large calibre rounds of ammunition arranged at a front of the vehicle along a bottom of a platform of the turret means in a vicinity of the gun means, a second revolving magazine means substantially filling a rear space of the vehicle for receiving rounds of ammunition in an upright position and a transfer means arranged in an empty space of the vehicle between said first revolving magazine means and said second revolving magazine means for transferring the rounds of ammunition from said second revolving magazine means to said first revolving magazine means, and wherein said second revolving magazine means includes a plurality of individual magazine units with each individual magazine unit accommodating a plurality of rounds of ammunition.

4,966,065

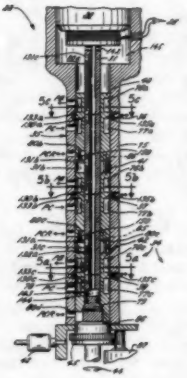
MULTIPLEXED HYDRAULIC CONTROL SYSTEMS

John W. Wardle, Roscoe, Ill., assignor to Woodward Governor Company, Rockford, Ill.

Filed Jan. 23, 1989, Ser. No. 298,939

Int. Cl.[5] F15B *13/06*

U.S. Cl. 91—361 6 Claims



5. A multiplexed dog valve for controlling fluid flow to a plurality of channels in accordance with a corresponding plurality of electrical control signals, the multiplexed dog valve having a plurality of sections, one for each channel, and comprising, in combination:

a linearly positionable spool having a plurality of pilot ports therein, one for each of the channels;

rotatable multiplexer means associated with the spool for sequentially connecting the pilot ports to a fluid source thereby sequentially enabling the pilot ports;

linear actuator means for responding to the sequence of electrical control signals for controlling the linear position of the spool and

linear actuator means for responding to the sequence of electrical control signals for controlling the linear position of the spool and thereby the opening of the pilot port enabled by the multiplexer means;

follower means for each section of the dog valve operatively coupled to the associated pilot port, the follower means having a multiplexed metering means for opening the pilot port in response to repositioning of the spool and closing of the pilot port upon repositioning of the follower, the multiplexing means serving to lock the follower in position when other sections of the dog valve are enabled by the multiplexer means;

an outlet port, one for each channel, metering means associated with the outlet port for controlling the degree of opening of the outlet port in response to the position of the follower means;

whereby the pilot ports sequentially reposition the follower

means during the associated multiplexed time slots for controlling the degree of opening of the outlet port to continuously control fluid flow to the associated channels.

4,966,066

LOAD SENSING SYSTEM WITH INCREASING PRIORITY IN SERIES OF CONTROL VALVES

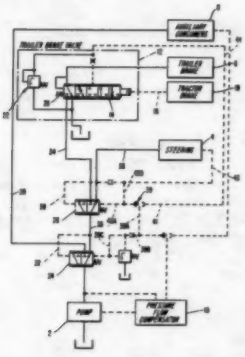
Wolfgang Kauss; Ludwig Muncke, both of Lohr/Main; Dietrich Radtke, Steinfeld-Hausen, and Kurt Wittich, Flörsbachtal, all of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Jun. 26, 1989, Ser. No. 371,075

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821416

Int. Cl.[5] F15B *11/00, 13/00*

U.S. Cl. 91—516 **5 Claims**



1. A hydraulic control circuit for at least two priority consuming units which are to be powered on a priority basis from a pump that is also relied upon to power at least one auxiliary consuming unit, said hydraulic control circuit comprising:

a first priority valve being supplied by said pump and having;

a priority position in which the fluid supplied by said pump is made available to a priority line for supplying the demands of said priority consuming units, and

a non-priority position in which the fluid supplied by said pump is made available to supply the demands of said auxiliary consuming units; and

a second priority valve connected to said priority line so as to be in series with said first priority valve, said second priority valve having;

a first position in which fluid from said priority line is made available to satisfy the demands of a most preferred one of said priority consuming units, and

a second position in which fluid from said priority line is made available to satisfy the demands of a less preferred one of said priority consuming units.

4,966,067

INVOLUTE CAM ACTUATOR WITH PISTON DRIVE

John Ames, Spring Lake, Mich.; David J. Lang, and Richard E. Walsh, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Feb. 27, 1989, Ser. No. 315,715

Int. Cl.[5] F01B *7/00*

U.S. Cl. 92—150 **9 Claims**

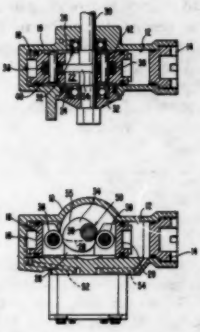
1. A mechanism for producing a linear relationship between angular movement of a shaft and axial movement of a piston comprising:

a piston operating along an axis of a cylinder and having first and second fluid pressure faces at opposite ends thereof;

a recess in a central portion of said piston;

a shaft mounted for rotation about an axis that extends transversely to said cylinder axis and having fixed thereto a cam member which is mounted for angular movement about the shaft axis in said recess;

cam engaging surfaces mounted on said piston with an invariant spacing at opposite sides of the recess and in constant engagement with opposed sides of said cam member; and



said cam member having a shape such that linear movement of the piston has a linear relationship with the angular movement of said shaft through a stroke which extends from both sides of a central position of said piston whereby, upon an application of a fluid pressure on one of said first and second fluid pressure faces of said piston, the piston is linearly moved causing an associated cam engaging surface to engage the cam member and rotate said shaft.

4,966,068

SPLIT CERAMIC PISTON RING ARRANGEMENT WITH NESTED BIASING RING

Reinhold Ficht, Kirchseeon, and Lutz Hamann, Assling, both of Fed. Rep. of Germany, assignors to Ficht GmbH, Kirchseeon, Fed. Rep. of Germany

Continuation of Ser. No. 139,133, Dec. 24, 1987, abandoned, which is a continuation of Ser. No. 797,636, Nov. 13, 1985, abandoned. This application Mar. 28, 1989, Ser. No. 330,973

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1984, 3443031

Int. Cl.[5] F16J *9/06, 9/24, 9/26*

U.S. Cl. 92—193 **5 Claims**

1. A piston ring arrangement for use in a ceramic material cylinder in an internal combustion engine comprising an axially displaceable piston having a circumferential surface, a first piston ring mounted in the circumferential surface of said piston, said piston and said first piston ring being formed of a ceramic material, wherein the improvement comprises that said first piston ring comprises two circumferentially extend-

ing parts, said piston having a circumferentially extending groove in the circumferential surface thereof, said two parts of said first piston ring mounted within said groove, a second divided spring piston ring formed of a ceramic material and having a smaller diameter than the first piston ring, the second piston ring located within and adjacent to the first piston ring, the end faces of said first piston ring parts being angularly offset relative to the end faces of said second piston ring, said groove having a first dimension extending in the axial direction of said piston and a second dimension extending in the radial direction of said piston, said first and second piston ring each having a first dimension extending in the axial direction of said piston and a second dimension extending in the radial direction of said piston, the second dimension of said groove being greater than the corresponding second dimension of said first piston ring, so that an annular space is defined for accommodating the second piston ring between the first piston ring and the base of said groove, said second piston ring biasing said first piston ring in the radial direction.

4,966,069

NOZZLE OUTLET

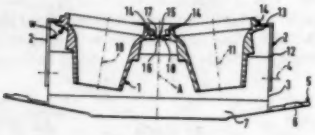
Gottfried Müller, and Paul Hipp, both of Kolbingen, Fed. Rep. of Germany, assignors to Schako Metallwarenfabrik Ferdinand Schad KG, Kolbingen, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,461

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1988, 3838419

Int. Cl.[5] F24F *13/068*

U.S. Cl. 98—40.11 **9 Claims**



1. A nozzle outlet for the introduction of warm and/or cold air into a room which comprises: an outlet housing having a central axis; a plurality of individual nozzles arranged in said outlet housing and having nozzle axes with an inclination; nozzle rails connected to said outlet housing; fastening brackets connecting at least one of said individual nozzles and nozzle rails to the outlet housing, said fastening brackets having a support leg and a fastening let; a receiving slot in one of said nozzles and nozzle rails engaging the fastening leg; wherein the support leg and fastening leg enclose an angle (w) to determine the inclination of the nozzles.

4,966,070

DEVICE FOR THE PREPARATION OF BEVERAGES

Martin Frisch, Reichenburg, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed Jun. 5, 1989, Ser. No. 361,244

Claims priority, application Switzerland, Jun. 8, 1988, 2177/88

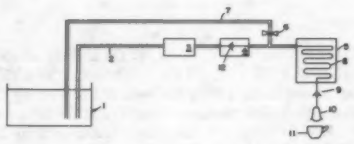
Int. Cl.[5] A47J *31/30, 31/34*

U.S. Cl. 99—302 R **7 Claims**

1. An apparatus for supplying and heating a quantity of water for preparing beverages comprising:

a water reservoir which is connected, in series by piping, to a flowmeter, which is connected by the piping to a pump, which is connected by the piping to a heating unit;

a non-return valve positioned in an exit water outlet of the heating unit;



a branch return pipe connected to the piping between the heating unit and the pump and terminating in the reservoir; and

an electro-valve positioned in the return pipe.

4,966,071

BREAD MOLDERS

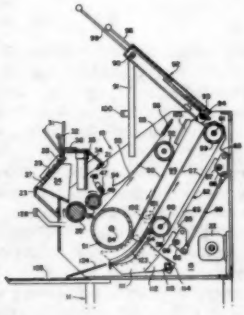
Paul E. Willett, Narangba, Australia, assignor to APV Baker Pty Ltd, Victoria, Australia

Filed Jun. 21, 1989, Ser. No. 369,194

Claims priority, application Australia, Jun. 21, 1988, PI8893

Int. Cl.[5] A21C *3/02, 3/10*

U.S. Cl. 99—450.1 **11 Claims**



1. A bread moulder comprising:

a housing,

driven upper and lower endless belts having converging runs arranged to work dough pieces therebetween mounted in the housing,

rollers for mounting the endless belts,

a belt adjustment frame carrying the rollers of the lower belt,

adjustment means for moving the belt adjustment frame and the lower belt towards or from the upper belt,

a delivery plate mounted on the belt adjustment frame and extending below the upper belt to receive and deliver a dough piece worked between the two belts, and

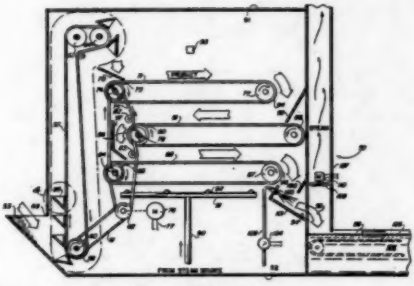
a series of spaced parallel splitter blades mounted for movement to advance them in unison through divisions in the delivery plate parallel to the direction of motion of a dough piece moving over the delivery plate or to retract them therefrom, the splitter blades when advanced dividing the moving dough piece into sections.

4,966,072

SHRIMP COOKING APPARATUS

Roy Ellis-Brown, Maitland, Fla., assignor to International Seafood Engineering, Inc., Miami, Fla.

Division of Ser. No. 182,301, Apr. 11, 1988, Pat. No. 4,887,524.
This application Oct. 10, 1989, Ser. No. 419,147
Int. Cl.[5] A23L *3/00*
U.S. Cl. 99—443 C 8 Claims



1. A shrimp cooking apparatus comprising:

a frame;

a plurality of motor driven porous endless belt conveyors positioned to drop shrimp from a top conveyor to a middle conveyor, and from a middle conveyor to a bottom conveyor of said plurality of conveyors,

a housing covering a portion of the porous endless belt conveyors and supported on said frame, said housing having an entrance thereinto and an exit therefrom;

a steam feed pipe connected to a source of steam at one end thereof;

a plurality of steam manifolds connected to said steam feed pipe and extending beneath the surface of the porous endless belt conveyors, each said manifold having a plurality of openings therein to release steam under said porous endless belt conveyors, whereby shrimp on said porous endless belt conveyors have heat and pressure applied thereto by the release of stem thereunder;

a solenoid valve connected to each steam manifold to control the release of stem from each manifold;

cooling means for cooling the shrimp exiting the housing to stop the cooking of the shrimp; and

sensing means for sensing the heat in said housing whereby shrimp can be cooked to a predetermined degree.

4,966,073

MIMEOGRAPHIC PRINTING APPARATUS WITH A STENCIL GUIDE

Takanori Hasegawa, Hachioji, and Hideo Negishi, Ibaragi, both of Japan, assignors to Riso Kagaku Corporation, Tokyo, Japan

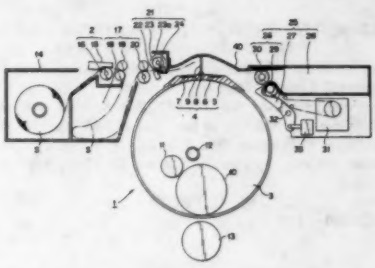
Filed Jun. 22, 1989, Ser. No. 369,231
Claims priority, application Japan, Jun. 22, 1988, 63-152390
Int. Cl.[5] B41L *13/06*
U.S. Cl. 101—120 16 Claims

1. A mimeographic printing apparatus, comprising:

(a) a rotary drum for mounting on a peripheral surface thereof a perforated stencil;

(b) a clamp pivotally supported on said rotary drum for clamping one end of the stencil in such a manner that the stencil may be wound around said peripheral surface of said rotary drum in response to rotation of said rotary drum;

(c) means for removing the stencil from said rotary drum after printing is finished; and



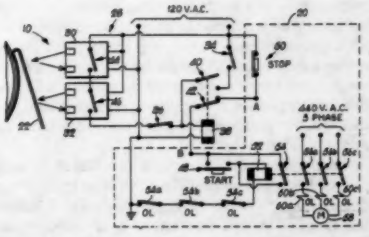
(d) a stencil guide engageable with said clamp at a first position above said rotary drum so as to move following the pivotal movement of said clamp.

4,966,074

WEB WRAP DETECTION SYSTEM FOR AN OFFSET WEB PRINTING PRESS

Wesley C. Aldrich, Jr., 12321 W. 52nd St., Shawnee, Kans. 66216

Filed Feb. 13, 1989, Ser. No. 309,214
Int. Cl.[5] B41F *5/06, 5/22*
U.S. Cl. 101—177 9 Claims



1. In a printing press machine operable for handling an elongated web of flexible material, the improvement comprising:

drive control means operable for selective starting and stopping of machine operation;

at least one rotatable roller adjacent to which the web travels during machine operation, the roller being subject to wrapping by the web in the event of web breakage during machine operation, the roller having a peripheral surface presenting circumferentially offset portions thereof; and

detection means for detecting wrapping said roller by the web, such being indicative of web breakage, said detection means including

first and second sensor means operable for optically sensing the occurrence of respective predetermined optical conditions within the fields-of-view thereof, the web presenting said optical conditions, said roller portions being subject to presenting said optical conditions,

mounting means for mounting said sensors adjacent said roller and offset from one another relative to roller rotation for presenting different circumferentially offset portions within the respective fields-in-view of said sensors, and

means for operably coupling said sensors with said drive control means for stopping machine operation only when both of said sensors sense said respective optical

conditions and for preventing stopping of machine operation by said sensors when only one of said roller offset portions presents said optical conditions.

4,966,075

MULTI-COLOR PRINTING METHOD AND APPARATUS WITH REGISTRATION MEANS

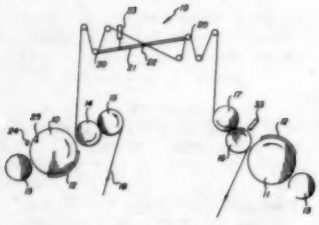
David A. Brian, Huddersfield, England, assignor to Cobden Chadwick Limited, Oldham, England

Continuation of Ser. No. 294,969, Jan. 5, 1989, abandoned, which is a continuation of Ser. No. 43,782, Apr. 29, 1987, abandoned. This application Aug. 28, 1989, Ser. No. 399,338

Claims priority, application United Kingdom, May 1, 1986, 8610688

Int. Cl.[5] B41M *1/14*

U.S. Cl. 101—211 16 Claims



8. A method of printing a succession of images onto an elongate web in at least two colors, said method comprising:

providing first and second feeding means for feeding said elongate web successively past first and second rotatable print cylinders each having a printing plate thereon providing a web length variation means, applying a first color image to said web by said printing plate on said first rotatable print cylinder and applying a second color image to said web by said printing plate on said second rotatable print cylinder;

periodically interrupting movement of said elongate web past said first and second rotatable print cylinders, permitting the length of said elongate web extending between said first and second feed means to be varied by said web length variation means, thereby enabling said feeding of said elongate web past one of said first and second rotatable print cylinders to be interrupted regardless of whether the feed of said elongate web past the other of said first and second rotatable print cylinders have been interrupted, controlling a repeat distance between said color images applied to said elongated web by controlling the length of said interruptions of movement of said elongate web past said second rotatable print cylinder in dependence upon the size of said first color image.

4,966,076

SYSTEM FOR RELEASABLY COUPLING A STUB SHAFT EXTENDING FROM A PRINTING CYLINDER TO A SHAFT PASSING THROUGH A MACHINE SIDE WALL

Thomas John, Augsburg, Fed. Rep. of Germany, assignor to MAN Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Nov. 1, 1989, Ser. No. 430,516

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 3837625

Int. Cl.[5] B41F *3/46*

U.S. Cl. 101—216 6 Claims

1. In combination with a printing machine having

a side wall (1);

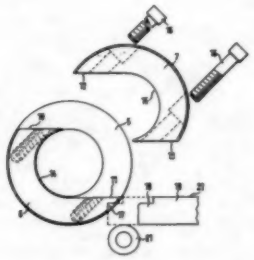
a cylinder or roller (9);

a stub shaft (8) extending axially from the cylinder or roller; and

a machine shaft (3) extending through said side wall (1) coaxial with said stub shaft 8,

a system for releasably coupling the stub shaft (8) to the machine shaft (3) and to permit removal of the cylinder (9) radially outwardly from the side wall, comprising

a clamping shell (6, 7) formed in two parts, wherein said two parts are separable from each other, one (6) of said parts



being secured to the machine shaft (3) and the other part (7) being removable from said one part, said parts defining separating surfaces (10–13) and clamping surfaces (14, 15) extending about said stub shaft; and

means (16) for attaching said parts together to clamp the stub shaft (8) between said parts,

wherein, in accordance with the invention,

at least one (11) of the separating surfaces of said one part (6) extends tangentially to the clamping surface (14) about the stub shaft of said one part (6).

4,966,077

LOADING OF BOREHOLES WITH EXPLOSIVE

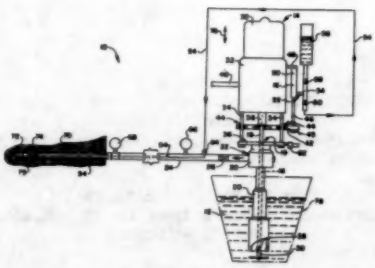
Pieter S. Halliday, Randburg; Gareth Tucker, Germiston; Carl H. Lübbe, Kempton Park; Alan J. Harris, Knoppieslaagte, and David G. Russell, Johannesburg, all of South Africa, assignors to AECI Limited, Johannesburg, South Africa

Filed Apr. 20, 1989, Ser. No. 340,765

Claims priority, application South Africa, Apr. 21, 1988, 88/2874

Int. Cl.[5] F42B *3/00*

U.S. Cl. 102—313 7 Claims



1. A mobile apparatus for loading a sensitized explosive of the slurry or emulsion type into a borehole, the apparatus comprising

a reciprocable positive displacement explosive base dosing pump having an inlet for explosive base;

a drive motor drivingly connected to the pump;

a flexible hose connected to an outlet of the dosing pump;

a lance connected to the end of the hose remote from the pump;

a mixing device mounted in the lance for subjecting fluid passing therethrough to mixing and shear;

a reciprocable positive displacement chemical gassing solution dosing pump having an inlet for chemical gassing solution, the gassing solution pump being operatively connected to the base pump for synchronous operation therewith; and

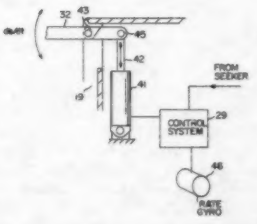
a flexible conduit connected to an outlet of the gassing solution pump and leading to the lance into which it feeds at a position upstream of the mixing device.

4,966,078

PROJECTILE STEERING APPARATUS AND METHOD

Lars J. Schleimann-Jensen, 182 34 Danderyd, Ekbacksvagen, Sweden

Continuation-in-part of Ser. No. 168,850, Mar. 16, 1988, Pat. No. 4,890,554. This application Dec. 27, 1989, Ser. No. 456,145
Claims priority, application Sweden, Mar. 20, 1987, 8701160-7
Int. Cl.[5] F42B *10/64*
U.S. Cl. 102—384 **5 Claims**



5. A method for steering a projectile comprising:

providing at a rear of said projectile a pair of rotor blades which rotate with said projectile, and which are angularly displaceable from the longitudinal axis of said projectile;

determining a trajectory error for said projectile; and,

varying the angular position of said blades with respect to the longitudinal axis of said projectile in synchronism with rotation of said projectile, whereby said rotor blades generate a power pattern which produces a lateral force on said projectile in a direction to reduce said trajectory error.

4,966,079

ICE PENETRATING MOORED MINE

Samuel A. Humphrey, Charleton, S.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 14, 1981, Ser. No. 334,667
Int. Cl.[5] F42B *22/44*
U.S. Cl. 102—411 **14 Claims**

13. A method of deploying and positioning a mine at a moored position in the water below an ice field comprising the steps of:

(a) dropping an elongated mine with braking means from an airplane,

(b) deploying the braking means in a manner to turn the mine to a vertical position so that the alignment of the mine is at a substantially 90° angle to the earth's surface,

(c) releasing the braking means so as to allow the mine to freely fall by gravitational pull and to attain a velocity of from about 150 to 500 ft. per second,

(d) causing the high velocity mine to strike and penetrate a ice field and to enter the water below the ice,

(e) automatically deploying of an anchor and tether means from the mine,

(f) automatically deploying an inflatable buoyancy means from the mine that moors the mine, and

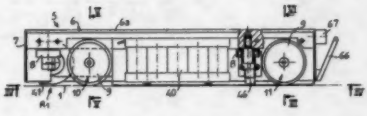
(g) automatically igniting a warhead by a target sensor.

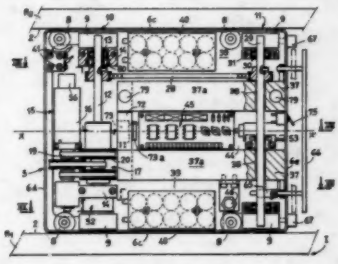
4,966,080

FREE TRANSFER MACHINE WITH INDEPENDENT MOTORIZED CARRIAGES

Etienne M. Teissier, Route de Montvendre, 26120 Malissard, and Bruno A. E. Marie, Camping Alain Merle, Route de Valence, 26120 Chabeuil, both of France

Filed Feb. 26, 1988, Ser. No. 161,090
Claims priority, application France, Mar. 4, 1987, 87 03129
Int. Cl.[5] B60L *11/00*
U.S. Cl. 104—289 **5 Claims**





1. Free transfer machine of the type comprising a trackway (I) set up in relation with work stations (P) and independent travelling carriages (5) which are carried, guided and driven along the trackway and which are adapted to the transfer the loads which they support, from one work station to another, each carriage being equipped with a train of driving wheels

actuated by an on-board electric drive member energized from an on-board battery, transfer machine wherein:

each carriage comprises:

a variable speed motor (15),

a rechargeable battery connected to contact blocks (41),

and an individual travelling control system comprising a motor supply and control circuit (45) which is controlled by a contact switch (65) actuated by a front bumper bar (66) mounted for pivoting on a front face of each carriage and retractable between buffers (67), said bar actuating the contact switch and by a contactor (73) mounted in series with the contact switch and carried by the lower face of the carriage in such a way as to be actuated by retractable stop members, (6a) provided at each work station to actuate the contactor (73) so as to cut off the power supply to the motor when either the contact switch (65) or the contactor (73) is actuated to prevent the carriage from hitting another carriage and to accurately position the carriage at a work station, said circuit being furthermore placed under the control of environment sensors (46,53),

the trackway (1) having a generally upwardly opening, "U" shaped cross-section comprising a pair of generally parallel rails (R_1, R_2) defining generally horizontal running surfaces and lateral guiding surfaces, the distance between the lateral guiding surfaces being greater than a lateral dimension of the carriage, and reed-contacts (42) located at each work station connected to an electric charge device and adapted to cooperate with the contact blocks (41) to re-charge the on-board battery when the carriage stops at the work station.

4,966,081

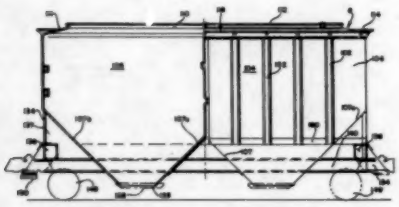
ARTICULATED MULTI-UNIT HOPPER RAILWAY CAR

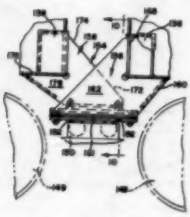
Danilo A. Dominguez, 1867 Piedras Cir., Danville, Calif. 94526, and James F. Flores, 4 Overhill Rd., Mill Valley, Calif. 94941

Filed Apr. 7, 1989, Ser. No. 335,045

Int. Cl.[5] B61D *17/00, 7/00*

U.S. Cl. 105—4.1 **25 Claims**





1. An articulated railway hopper car having a plurality of units connected end to end comprising

a pair of end units having at least one hopper for carrying commodities, said pair of end units each having an outboard end with a coupler and an inboard end,

a plurality of intermediate units connected end to end between said inboard ends of said end units, each of said intermediate units having at least one hopper,

said end units being respectively mounted on a pair of first truck assemblies adjacent said outboard ends,

a plurality of second truck assemblies respectively being arranged beneath said inboard ends of said end units and the ends of said intermediate units,

at least one of said plurality of second truck assemblies being respectively shared by an end unit and by an adjacent one of said intermediate units and at least one of said plurality of second truck assemblies being shared by adjacent intermediate units,

a plurality of connector assemblies and extension arm assemblies for respectively connecting said end units and said intermediate units

each of said pair of end units and said plurality of intermediate units having a longitudinally extending center sill, torsion beam means positioned above and extending laterally from said center sill at said inboard ends of said end units and the ends of said plurality of intermediate units, said torsion beam means being affixed to said center sill and

support means and said plurality of extension arm assemblies carried by said torsion beam means and said support means being affixed to said at least one hopper of said end units and said least one hopper of said plurality of intermediate units.

4,966,082

CONSTRUCTION AND A MANUFACTURING METHOD OF UNDERFRAME FOR A ROLLING STOCK

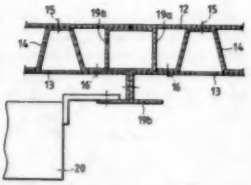
Michifumi Takeichi; Hisashi Tani; Katsuyuki Terada; Takeyuki Watanabe; Sumio Okuno, and Masayuki Dogen, all of Kudamatsu, Japan, assignors to Hitachi, Ltd., Tokyo and Kasado Kikai Co., Ltd., Yamaguchi, both of, Japan

Filed Oct. 17, 1988, Ser. No. 258,590

Claims priority, application Japan, Oct. 21, 1987, 62-263907; Mar. 11, 1988, 63-56090

Int. Cl.[5] B62P *33/02*

U.S. Cl. 105—422 **19 Claims**



1. An underframe construction for a rolling stock, the underframe construction comprising:

longitudinally extending side sills;

end sills extending transversely of the side sills and connecting opposite ends of one side sill to corresponding opposite ends of another side sill;

body bolsters respectively disposed at positions corresponding to trucks of the rolling stock;

center sills extending between the body bolsters and the corresponding end sills in parallel to the side sills; and

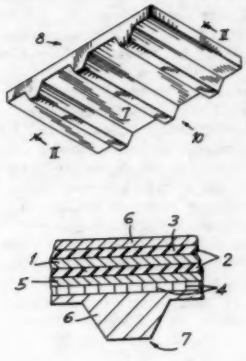
a floor member disposed in an area defined by the side sills and said body bolsters, said floor member comprising an upper plate, a lower plate, and a corrugated plate disposed between the upper plate and the lower plate, said corrugated plate including an alternate arrangement of ridges and furrows disposed in a transverse direction of said underframe and extending in a longitudinal direction of said underframe, and wherein said corrugated plate is fixedly joined to both the upper plate and the lower plate.

4,966,083

MONOBLOCK PALLET

Benedito S. Cerugeira, Rua Itapiru, 281 apto. 55, 04143 Sao Paulo, Brazil

Filed Dec. 6, 1989, Ser. No. 447,015
Claims priority, application Brazil, Dec. 26, 1988, 8806880
Int. Cl.[5] B65D *19/00*
U.S. Cl. 108—51.1 6 Claims



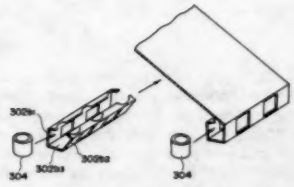
1. Monoblock pallet, characterized in that it is compounded in one sole piece (10), constituted of at least one metallic wiring core (1) impregnated with a curable material, one lining layer (3) of curable material impregnated with fragmentary material (2), one layer of reticulated strips (4) of a material elastically resistant impregnated with a curable material (5), and two external layers of a non-slipping material (6), which define the upper area (8), for contacting and accommodating the load, and the lower or inferior area (7), for the insertion of the loading forks of a fork lift machine.

4,966,084

PALLET FOR SUPPORTING ARTICLE

Akira Motomaru, Tsuchiura, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 326,213
Claims priority, application Japan, Mar. 22, 1988, 63-067650; Mar. 25, 1988, 63-038439[U]; May 17, 1988, 63-121094; Dec. 22, 1988, 63-166623[U]; Dec. 23, 1988, 63-167382[U]; Dec. 26, 1988, 63-168639[U]
Int. Cl.[5] B65D *19/00*
U.S. Cl. 108—51.3 3 Claims



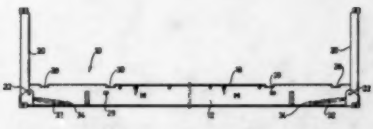
1. A pallet for supporting articles comprising:
an upper plate member for supporting the articles;
a lower plate member spaced apart form said upper plate member;
retainers secured between said upper plate member and said lower plate member; and
cylindrical spacers, having an upper and lower end, housed in said retainers for supporting said upper plate member, wherein
said retainers include a bottom surface bordered by an outer side surface and an inner side surface, and a first folding surface adjacent to said outer side surface and a second folding surface adjacent to said inner side surface, wherein said first and second folding surfaces include semi-circular cut-out portions corresponding to an outer periphery of said cylindrical spacers, and wherein said retainer is folded to form a hollow housing to house said spacers and said semi-circular cut-out portions are flush with said upper end of spacer, and said first and second folding surfaces and said upper end of said spacers are fixed to said upper plate member.

4,966,085

FOLDING FREIGHT CARRIER

Peter Howe, 24, Headroomgate Road, St. Annes-on-Sea, Lancashire, England

Continuation of Ser. No. 320,840, Mar. 9, 1989, abandoned, which is a continuation of Ser. No. 222,389, Jul. 21, 1988, abandoned, which is a continuation of Ser. No. 102,743, Sep. 24, 1987, abandoned, which is a continuation of Ser. No. 841,043, Mar. 14, 1986, abandoned, which is a continuation of Ser. No. 576,177, Feb. 3, 1984, abandoned, which is a continuation of Ser. No. 507,536, Jun. 24, 1983, abandoned, which is a continuation of Ser. No. 196,065, Oct. 10, 1980, abandoned. This application Oct. 6, 1989, Ser. No. 418,761
Claims priority, application United Kingdom, Oct. 16, 1979, 7935920
Int. Cl.[5] B61D *17/06*; B65D *19/00*
U.S. Cl. 108—55.1 3 Claims



1. A folding freight carrier comprising: a base structure having a substantially plane continuous upper surface forming a load bearing freight carrying platform; post members at or closely adjacent to each corner of the base structure which are pivotally mounted thereon so as to be capable of being selectively pivoted from an erect upwardly extending, upright position to a folded position in which each post member lies parallel to, or substantially parallel to, the base structure, the continuous plane load bearing freight carrying platform extending between the two post members at each end of the carrier; means attached to the lower end of each post member and the base for urging each post into the erect upwardly extending upright position; each post member in the folded position being disposed so as not to project above the upper surface of the base structure and forming together with the existing upper surface an uninterrupted, solid continuous plane load bearing freight carrying platform extending across substantially the full width and length of the freight carrier; each of the sides of the base structure adjacent to each corner having an elongated recess formed therein in each of which the associated post member is entirely received when in the folded position, there further being separated support means within each said elongated recess, said support means being positioned above the bottom of the base structure, for supporting the associated post member in its folded position and enabling the post member to have a load bearing capability; the two post members at each end of the base structure being connected together by at least one cross member to form a unitary end structure, the upper surface of the base structure being provided with at least one cross corresponding recess therein in which the associated cross member is located when the end structure is in the folded position so that each cross member

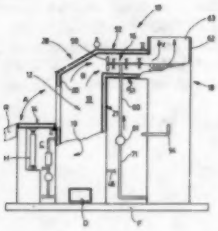
does not project above said upper surface of the base structure; the lower end of each post member being provided with an attachment means whereby, when the posts are in their folded position, said attachment means are capable of being connected to a lifting apparatus to effect lifting and transportation of the folded carrier; and wherein the pivotal axis of each post member is disposed adjacent to the lower end thereof but spaced apart from the position of the attachment means in a direction towards the free upper end of the post member, so that when the carrier is lifted with the post members in their folded position by utilization of the attachment means on each post member, the lifting force exerted thereon urges the post members toward their folded position.

4,966,086

WATER COOLED INCINERATOR

Clarence H. Houston, 327 Deliz Street, Orillia, Ontario, Canada (L3V 1H1)

Filed Feb. 21, 1990, Ser. No. 482,871
Claims priority, application Canada, Feb. 22, 1989, 591780
Int. Cl.[5] F23J *15/00*
U.S. Cl. 110—215 **12 Claims**



1. An incinerating device of metallic construction and which comprises:

a combustion chamber having upstanding metallic wall structures, each being formed by mutually spaced apart inner and outer metallic wall members and an overhead metallic roof structure formed by mutually spaced apart upper and lower metallic roof members;

a metallic door structure mounted on said combustion chamber for movement between a closed position and an open position for the introduction into said combustion chamber of material to be incinerated and formed by mutually spaced apart inner and outer metallic door members;

a hearth means within said combustion chamber for supporting material being incinerated within said chamber;

burner means associated with said hearth means within said combustion chamber for incinerating material within said chamber;

fuel supply means connected to said burner means for supplying fuel thereto;

grate means within said combustion chamber below said hearth means for receiving solid combustion products during incineration of material within said combustion chamber;

at least one cooling water supply means associated with said combustion chamber for supplying water to the spaces between said inner and outer wall members, the space between said upper and lower roof members and the space between said inner and outer door members;

at least one cooling water discharge means associated with said combustion chamber for discharging cooling water after its passage through the spaces between said inner and outer wall members, the space between said upper and lower roof members and the space between said inner and outer door members of said combustion chamber;

at least one first recirculating means for recirculating cooling water from said cooling water discharge means to said cooling water supply means;

a gas-scrubbing chamber connected to said combustion chamber for receiving combustion gases therefrom;

water spray means in said gas-scrubbing chamber for discharging water through said combustion gases passing through said gas-scrubbing chamber;

scrubbing water supply means associated with said water spray means for supplying gas-scrubbing water thereto;

filter tower means connected to said gas-scrubbing chamber for receiving both scrubbed combustion gases and scrubbing water from said gas-scrubbing chamber at an upper end of said filter tower means;

gas discharge means at an elevated position in said filter tower means for the discharge of scrubbed combustion gases from said filter tower means;

filter means in said filter tower means for filtering scrubbing water falling downwardly therethrough;

scrubbing water discharge means in said filter tower means for the discharge of filtered scrubbing water therefrom;

second recirculating means connecting said scrubbing water discharge means in said filter tower means to said scrubbing water supply means for transporting filtered scrubbing water to said water spray means;

flushing means associated with said filter means for discharging water to said filter means to dislodge solid material therefrom; and

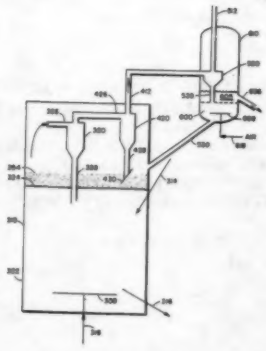
waste water discharge means in said filter tower for discharging waste water containing solid material therefrom.

4,966,087

FLUIDIZED BED COAL/COKE COMBUSTION

Jonathan E. Child, Sewell, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 84,243, Aug. 12, 1987, Pat. No. 4,812,431. This application Mar. 13, 1989, Ser. No. 322,732
Int. Cl.[5] F23J *11/00, 15/00*
U.S. Cl. 110—345 **19 Claims**



1. In a coal combustion process wherein oxygen or an oxygen containing gas is added to a single, dense phase fluidized bed comprising coal particles having an average particle and and average settling velocity, said dense bed comprising a lower one half and an upper one half, and wherein coal is burned in the dense bed to produce heat and a flue gas containing CO, CO2, O2 and NOx, the improvement comprising adding 0.001 to 100 wt ppm of a CO combustion promoter to increase the combustion of CO to CO2 in the dense bed, said CO combustion promoter being disposed on a porous support and wherein the porous support particles have a settling velocity which is smaller than the settling velocity of the average particles in the dense phase fluidized bed whereby said CO combustion promoter segregates in the dense phase fluidized

bed so that a majority of the combustion promoter is present in the upper one half of the dense bed.

4,966,088

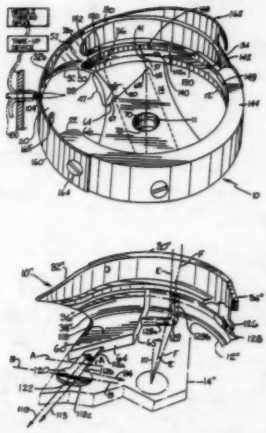
COMPOSITE ROTARY LOOP TAKER FOR LOCK-STITCH SEWING MACHINE

Paul Badillo, Denver, Colo., assignor to Bakron Corp., Morton Grove, Ill.

Continuation of Ser. No. 25,452, Mar. 13, 1987, abandoned. This application Dec. 28, 1988, Ser. No. 292,652

Int. Cl.[5] D05B *57/08*

U.S. Cl. 112—184 **34 Claims**



1. A rotary loop taker for high speed rotation about a bobbin basket maintained in a substantially fixed position in a lock-stitch sewing machine below the take-up device of said machine, in which sewing machine the needle provides one of the two threads that together form said lock-stitch, said needle thread being taken off the needle in the form of a loop by the loop seizing point of said rotary loop taker as the loop taker rotates about the bobbin basket, the side wall of said bobbin basket carrying a radially extending rib for engaging the loop taker as the latter rotates about said bobbin basket, which rotary loop taker comprises:

(a) a frame of substantially annular construction, said frame having an axis of rotation located generally perpendicular to the frame, the radially inner wall of said frame defining the lower ledge of the middle and final portions of a raceway to receive said radially extending rib on the side wall of said bobbin basket, said frame having a cut-away portion along one segment of its circumference to provide space for the needle thread to exit from the loop seizing point of the rotary loop taker as said thread is pulled off the loop seizing point, said cut-away portion being defined by an end wall of said frame and the forward portion of said loop seizing point facing upon said cut-away portion;

(b) a frame support member extending crosswise of said substantially annular frame, with one edge portion of said support member facing said cut-away portion of the frame;

(c) means for supporting said substantially annular frame for rotation of the same about its said axis of rotation, and about said bobbin basket, during operation of said sewing machine;

(d) a gib secured to said frame to define the upper ledge of said middle and final portions of said bobbin case raceway,

(e) a loop seizing point having a tapered forward end including a base and a free end, with the largest transverse dimensions of said tapered forward end being at said base, said base lying immediately adjacent said substantially annular frame, and the smallest transverse dimensions of said tapered forward end being at its said free end, said free end extending circumferentially forward into said cut-away portion of said substantially annular frame; and

said tapered forward end of the loop seizing point including on its surface radially inner and outer lower quadrants, and radially inner and outer upper quadrants, each of said quadrants extending from said base to said free end of said tapered forward end,

said substantially annular frame forming a smoothly curved junction, free of any seams or joints, with the two lower quadrants of said tapered forward end of the loop seizing point, for guiding said loop of needle thread as it moves from said free end of the tapered forward end down to the rearwardmost position assumed by said loop on the portion of said tapered forward end adjacent its base, and back to said free end again,

said rotary loop taker being formed of two different materials, one of which is metal of a predetermined type,

said free end of said tapered forward end of the loop seizing point being formed of solid metal of said predetermined type, said solid metal free end extending circumferentially rearward a distance at least equal to a substantial fraction of the distance from the free end to the base of said tapered forward end,

the radially outer wall of the tapered forward end of the loop seizing point including a first surface portion of metal of said predetermined type extending from said solid metal free end through the above described smoothly curved junction, said metal surface portion forming the entire exterior surface of that part of said radially outer lower quadrant of said tapered forward end that lies circumferentially rearward of said solid metal free end, and forming the exterior surface of at least that part of the approximate bottom one-quarter of said radially outer upper quadrant that lies circumferentially rearward from said solid metal free end,

the radially inner wall of said tapered forward end of the loop seizing point including a second surface portion of metal of said predetermined type extending from said solid metal free end through said smoothly curved junction, said metal surface portion forming the entire exterior surface of that part of said radially inner lower quadrant of said tapered forward end that lies circumferentially rearward of said solid metal free end, and forming the exterior surface of at least about the forward one-half of the part of said radially inner upper quadrant that lies circumferentially inward of said solid free end,

said first and second metal surface portions each having a substantial thickness relative to the maximum transverse dimension of said base of the tapered forward end of the loop seizing point,

said solid metal free end and said first and second metal surface portions being integrally formed with each other and with the above described smoothly curved junction,

(f) means formed of metal for anchoring said loop seizing point to said crosswise support member, said metal anchoring means being integrally formed with said solid metal free end and said first and second metal surface portions of said tapered forward end of the loop seizing point and with said smoothly curved junction, said anchoring means extending inward toward the central portion of the crosswise support member from the bottom portion of said annular frame for a substantial distance away from said tapered forward end of the loop seizing point, and being embedded in said crosswise support member, with a plurality of contact surfaces lying within said support member,

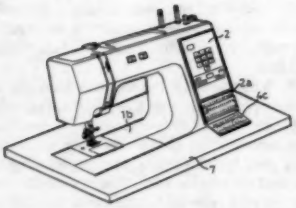
a substantial part of said rotary loop taker being formed of a second material other than said metal of a predetermined type, said second material comprising a flowable, hardenable material surrounding all said contact surfaces of said metal anchoring means that lie within said crosswise extending support member of the rotary loop taker, in full, intimate contact with said surfaces, and filling all portions of said rotary loop taker not occupied by components thereof that are formed of metal, in full, intimate contact with said metal components, to form a secure, permanent attachment between said metal components and the remainder of the rotary loop taker, the resulting exterior surface of said loop seizing point being smooth throughout its entire area.

4,966,089

A SEWING MACHINE WITH A PIVOTABLE STITCH PATTERN TABLE

Susumu Hanyu, and Masashi Ninomiya, both of Tokyo, Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed Jun. 3, 1989, Ser. No. 202,873
Claims priority, application Japan, Jun. 17, 1987, 62-91982[U]
Int. Cl.[5] D05B *3/02*
U.S. Cl. 112—444 **3 Claims**



1. A sewing machine comprising a machine frame having a front face, an operating panel having a lower end, said operating panel being secured to said front face of said machine frame, a pattern selecting means, a pivotable pattern table located at said lower end of said operating panel below said pattern selecting means and having both an inside and an outside surface and stitch pattern indicating means supported on said inside surface of said pattern table, said pattern table being pivotable from a closed position in which said outside surface of said pattern table is flush with an outside surface of the operating panel and into an open position in which said pattern table outside surface is resting on said machine frame so that both said stitch pattern indicating means and said stitch pattern selecting means are simultaneously visible to an operator.

4,966,090

FABRIC EDGE TRACE STITCHING SYSTEM

Takahumi Tanaka, Nagoya, and Nobuyasu Ooshima, Kounan, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 30, 1989, Ser. No. 400,775
Claims priority, application Japan, Sep. 2, 1988, 63-220651
Int. Cl.[5] D05B *3/02*
U.S. Cl. 112—456 **4 Claims**

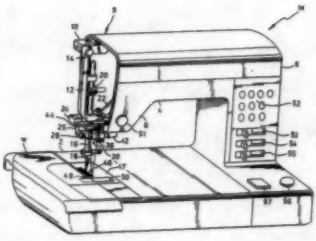
1. A fabric edge trace stitching system in combination with a sewing machine including; a bed for supporting a work fabric to be sewn, a needle movable for vertical reciprocation, a driving actuator driven for changing a relative position of the needle and the work fabric in a direction perpendicular to a feed direction for feeding the work fabric, and a drive control means for controlling the driving actuator in synchronism with the vertical reciprocation of the needle;

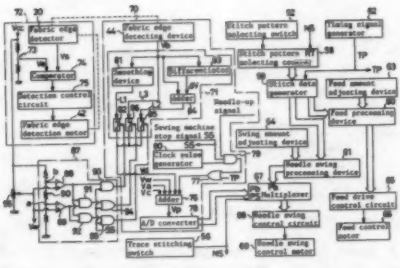
the fabric edge trace stitching system is characterized by comprising;

a fabric edge detecting means for detecting an edge of the work fabric on the bed,

a trace width setting means for setting a trace width from the fabric edge to a stitching position,

a signal compensating means for receiving a fabric edge position signal supplied from the fabric edge detecting means, and including a signal smoothing means for smoothing the fabric edge position signal and a signal passing means for passing the fabric edge position signal without processing,





a stitch position control means for commanding the drive control means to control the driving actuator so as to stitch at the stitching position distant from the fabric edge by the trace width set with the trace width setting means, based on the fabric edge position signal supplied from the signal compensating means, and

a switching means for switching one of the signal smoothing means and the signal passing means to be operative.

4,966,091

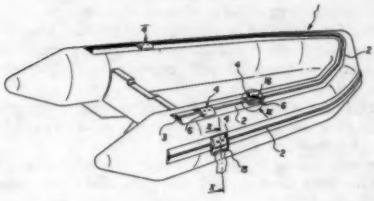
SYSTEM FOR MOUNTING ACCESSORIES ON INFLATABLE STRUCTURES SUCH AS BOATS

Henri F. L. H. De Suarez D'Aulan, 101 rue du Bac, 75007, Paris, France

Filed Jun. 29, 1988, Ser. No. 213,053
Claims priority, application France, Jul. 3, 1987, 87 09502
Int. Cl.[5] B63B *7/00*
U.S. Cl. 114—345 **7 Claims**

1. A system for mounting accessories on inflatable structures such as boats, comprising: a profiled molding forming a strip adapted to be secured to the inflatable structure, and a selectively, removably securable, position-adjustable device adapted to engage and be secured to said profiled molding for mounting accessories and accessory-fittings thereon, wherein said profiled molding is in the form of a slide-bar having a T-shaped groove, said removable accessory-mounting device having an anchor-block member adapted to engage and be held in said groove, an outer member forming an accessory-fitting

adapted to engage the outer surface of the molding on either side of the groove, and securing means for removably attaching the outer member to the anchor-block member, by securing the two members onto the molding.

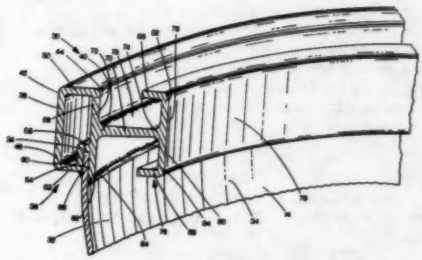


4,966,092

INTEGRAL GUNWALE CONSTRUCTION

William J. Illingworth, 1440 Justice Rd., Central Point, Oreg. 97502

Filed Feb. 21, 1990, Ser. No. 483,556
Int. Cl.[5] B63B *3/00*
U.S. Cl. 114—356 6 Claims



1. An integral gunwale and handrail member for an aluminum boat having a side with an upper edge, comprising:

a generally longitudinally extending gunwale member, the gunwale member comprising a generally longitudinally extending outboard wall member and a generally longitudinally extending inboard wall member, said outboard and inboard wall members being joined by at least one generally horizontal member, the gunwale member further comprising attachment means for attaching said gunwale member to the upper edge of the side of the aluminum boat;

a horizontal generally longitudinally extending web member having outboard and inboard edges, the outboard edge of said web member being attached to the inboard wall member of the gunwale member; and

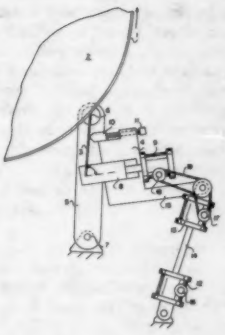
a generally longitudinally extending handrail member attached to the inboard edge of the web member, the handrail member comprising at least one upright member, the upright member extending upwardly above the web member, whereby the upright member may be grasped by an occupant of the boat.

4,966,093

DEVICE FOR CONTINUOUSLY COATING A WEB OF MATERIAL TRAVELING AROUND A BACKING ROLLER

Herbert Sommer, Düsseldorf, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jul. 25, 1989, Ser. No. 385,345
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825816
Int. Cl.[5] B05C *11/04*
U.S. Cl. 118—126 9 Claims



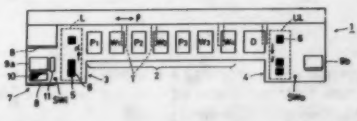
1. In a device for continuously coating a web of material travelling around a backing roller and including a doctor beam, a doctor blade having a foot mounted on the doctor beam and an edge for contacting the web of material, means for setting an angle of the blade relative to a tangent to the backing roller, an element mounted on the doctor beam for supporting the doctor blade on a side facing away from the backing roller and between the foot and the edge, means for moving the foot of the doctor blade relative to the doctor beam and the supporting element when the edge is in contact with the web of material at the set angle to adjust the pressure of the blade against the backing roller and thereby deforming the blade and changing the set angle of the blade, wherein the improvement comprises means for pivoting the doctor beam and thereby the doctor blade to compensate for the change in the set angle when the pressure of the blade is adjusted to dispose the blade at the set angle.

4,966,094

SURFACE TREATMENT METHOD AND APPARATUS THEREFOR

Takuma Yamada, Moriyama, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Division of Ser. No. 228,863, Aug. 4, 1988, Pat. No. 4,892,761, which is a continuation of Ser. No. 906,401, Sep. 9, 1986, abandoned. This application Aug. 25, 1989, Ser. No. 398,567
Claims priority, application Japan, Oct. 1, 1985, 60-219868
Int. Cl.[5] B05C *3/02*
U.S. Cl. 118—698 12 Claims



1. Control apparatus for controlling a surface treatment system that transports a number of objects to subject the objects to different series of treatment steps in a treatment bath

train, the treatment bath train having a plurality of treatment baths as well as a drain mechanism for individually draining the baths and a delivery mechaniam for delivering a selected treatment liquid to each individual bath, by serially dipping each of said objects in selected treatment liquids supplied in said treatment baths for a predetermined number of times respectively in a dipping order which is previously determined according to a treatment program for each of said objects individually control apparatus comprising:

clock time detector means for detecting a reference clock time at which a particular one of said objects is actually brought into said treatment bath train;

first calculator means, enabled before said particular object arrives at a particular one of said treatment baths, for calculating an expected clock time at which said particular object is expected to arrive at said particular treatment bath on the basis of said reference clock time and a first predetermined time period required for said particular object to be treated in at least one preceding treatment bath in a corresponding dipping order therefor before said particular object arrives at said particular treatment bath;

second calculator means for calculating a first clock time after which a known lifetime of said treatment liquid currently available in said particular treatment bath is over;

third calculator means for calculating a second clock time which is later than said expected clock time by a predetermined second time period during which said particular objects is to be dipped in a treatment liquid in said particular treatment baths; and

first comparator means for comparing said second clock time with said first clock time to generate a first command signal if said second clock time is later than second first clock time said first command signal being provided to said delivering mechanism to control the same to replace at least a portion of said treatment liquid in said particular treatment bath.

4,966,095

APPARATUS FOR FORMING A THIN FILM

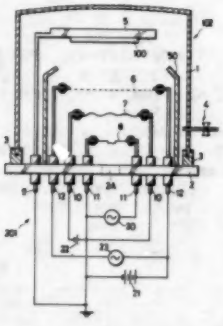
Wasaburo Ohta, and Masashi Nakazawa, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 10, 1989, Ser. No. 392,099

Claims priority, application Japan, Aug. 15, 1988, 63-202862

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—723 **9 Claims**



9. An apparatus for forming a thin film comprising:

a vacuum container evacuated to high vacuum and receiving a gas for vapor deposition therein;

a source of evaporation disposed in said container for evaporating a substance to be evaporated;

a counter electrode disposed in said container and holding a substrate to be vapor-deposited such that said substrate opposes said source;

a filament disposed between said source and said electrode for generating thermions;

a grid disposed between said filament and said electrode for allowing said evaporated substance to pass therethrough and accelerating said evaporated substance;

an electrical potential power supply connected to said electrode, said filament and said grid for maintaining said grid at a positive potential with respect to said electrode and said filament;

an electrical heating power supply connected to said grid for supplying said grid with an electrical power so as to electrically heat said grid; and

a cover disposed in said container for surrounding said source, said filament, and said grid, said cover provided with an opening at a side facing said electrode.

4,966,096

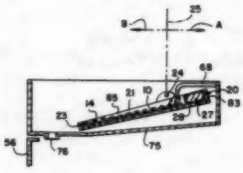
WATER PURIFICATION SYSTEM AND APPARATUS

Walter H. Adey, Washington, D.C., assignor to Ecological Systems Technology, L.P., Washington, D.C.

Filed Aug. 4, 1988, Ser. No. 228,114

Int. Cl.[5] A01K *63/04*; C02F *3/08*

U.S. Cl. 119—3 **33 Claims**



1. An algal turf scrubber comprising:

a moveable, substantially flat surface for growing an algal turf when said surface is in contact with water;

an algal turf attached to said surface; and

moving means for moving said surface to create an oscillatory surge of water across said algal turf when it is in contact with water.

4,966,097

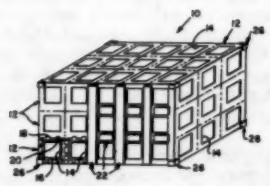
ANIMAL CONTAINMENT SYSTEM

Edwin D. Rosenberger, 328 E. 5th St., Apt. 1, Brooklyn, N.Y. 11218

Filed Mar. 16, 1988, Ser. No. 169,011

Int. Cl.[5] A01K *1/00*; E04C *3/00*

U.S. Cl. 119—19 **2 Claims**



1. An animal containment system, comprising, an assembly of a plurality of frame interconnected and forming an enclosure for the confinement of birds and animals, interlocking means provided on and in said frames, holding adjacent said frames together and connector cleat means firmly securing said enclosures together, wherein each frame of said plurality of frames is square in configuration and has a face formed with a

central through-aperture for receiving a panel; said interlocking means comprises integrally attached and spaced projections on adjacent edges of said frame, and spaced cut-out openings are provided in other adjacent edges of said frame and engaged with said projections of an adjacent said frame, grooves are provided in faces of said frames snd extend to said edges of said frames with grooves of adjacent frames in end-to-end alignment; said connector cleat means comprising long and short connector cleats each including parallel spaced apart rails integrally attached to a common side of each cleat with the rails of the short cleats being received in said grooves of adjacent single said frames and with the rails of respective long cleats received in aligned grooves of a series of adjacent frames so that the short cleats releasably attach individual frames together and the long cleats releasably attach the series of adjacent frames together.

4,966,098

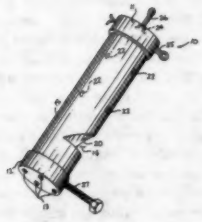
METHOD OF FORMING A GAME AND PET FEEDER

Lamont L. Freeman, 1906 Invermere, Spring, Tex. 77386

Filed Aug. 7, 1989, Ser. No. 390,980

Int. Cl.[5] A01K *39/01*

U.S. Cl. 119—52.2 **4 Claims**



1. A method of forming a game and pet feeder comprising the steps of:

providing an elongate, polymeric cylindrical body including a top end and a bottom end and arranging each end orthogonally to an elongate axis defined by the cylindrical body, and

securing a bottom cap to the bottom end and a top cap to the top end, and

forming a dispensing mouth with the cylindrical body adjacent the bottom end, and

wherein the step of forming a dispensing mouth includes the steps of forming a semi-cylindrical slot directed orthogonally to the axis of the elongate body, and applying heat to a triangular segment overlying the slot until the segment is softened from a rigid to a semi-rigid segment, and forcibly directing a force member against an exterior surface of the segment and forcing the segment interiorly of the cylindrical body until the segment forms an apex and wherein the apex contacts an interior surface of the cylindrical body, and

wherein the step of securing the bottom cap to the bottom end of the cylindrical body includes the step of forming a matrix of apertures through a bottom end surface of the bottom cap and subsequently securing the bottom cap to the bottom end of the cylindrical body, and

wherein the step of securing the bottom cap to the bottom end of the cylindrical body includes the step of directing an elongate threaded member through a skirt of the bottom cap overlying the cylindrical body and further directing the threaded member through the cylindrical body adjacent the skirt to secure the cylindrical body and the bottom cap together, and

wherein the threaded member is directed through the skirt of the bottom cap and the cylindrical body to provide a predetermined length of the threaded member extending exteriorly of the skirt and orthogonally relative to the axis of the cylindrical body and underlying the dispensing mouth.

4,966,099

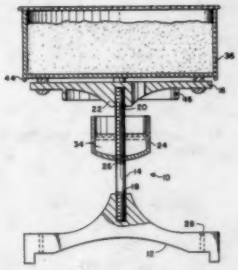
PET FEEDER AND METHOD FOR FEEDING

James R. Arney, P.O. Box 1646, Hemphill, Tex. 75948

Filed Dec. 27, 1988, Ser. No. 290,308

Int. Cl.[5] A01K *5/01*

U.S. Cl. 119—61 **8 Claims**



1. A pet feeder comprising a base member, an upstanding support rod having one end secured to the base member, a disk-like support plate secured to the other end of said support rod, a liquid receptacle secured to said support rod intermediate the ends thereof; said support plate having a plurality of radially spaced openings therein; a pet food dish having a plurality of depending feet spaced and arranged so as to be engagable with the openings in said support plate, each of said feet having an enlargement thereon for retaining said feet in said openings in said support plate; said food dish having a diameter slightly greater than the diameter of said support plate so as to extend radially beyond the edge of said support plate.

4,966,100

DEVICE FOR PROTECTING SCREENS IN BOILERS, AND IN PARTICULAR FOR GARBAGE INCINERATORS, AND PROCEDURE FOR MANUFACTURE OF THIS DEVICE

Jean Fournier, Rochefort en Yvelines, and Adrian Casariego, Velizy Villacoublay, both of France, assignors to Societe Anonyme dite: Stein Industrie, Velizy-Villacoublay, France

Filed Aug. 22, 1989, Ser. No. 396,702

Claims priority, application France, Aug. 22, 1988, 88 11095

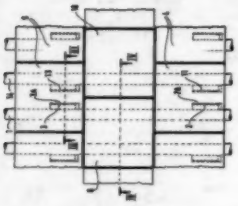
The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.[5] F22B *37/00*

U.S. Cl. 122—6 A **6 Claims**

1. Device for the protection of heat-recovery boiler screens, in particular for garbage incinerators, these screens being constructed using vertical tubes (1, 14) joined together by welded joining ribs (17) installed behind fireproof bricks and equipped with means for fastening to said bricks, said tubes having vertical fastening ribs (2, 11; 3, 13) forming an angle of between 30° and 60° with the plane of the joining ribs, which are made discontinuous at intervals on the vertical sections of the tubes, a first series of fireproof bricks (4, 5) having, in their lower portion, vertical grooves (2A, 3A) having a width and thickness corresponding to those of the auxiliary ribs, and extending over only a fraction of their height beginning at the base and being fastened onto the upper portion of the auxiliary ribs, a fireproof cement being spread between the fireproof bricks on the one hand, and the tubes and the ribs on the other; wherein a second series of bricks (6, 18), alternating with the bricks of the first series, has at its upper and lower ends, inside

recesses (9, 10) imparting to them a general dovetail shape, and wherein the bricks making up the first series have corresponding recesses (7, 8) ensuring the interlocking in position of the bricks composing the second series.



4,966,101

FLUIDIZED BED APPARATUS

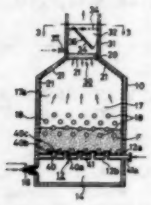
Sadahiko Maeda, Tokyo; Yasumasa Idei, and Shinji Matsurra, both of Ube, all of Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed May 10, 1989, Ser. No. 349,771

Claims priority, application Japan, May 17, 1988, 63-118166; Nov. 25, 1988, 63-152511[U]; Nov. 25, 1988, 63-152512[U]; Apr. 13, 1989, 1-93948

Int. Cl.[5] F22B *1/02*

U.S. Cl. 122—4 D 13 Claims



1. A fluidized bed apparatus having fluidizing mediums therein, comprising,

a furnace body having a combusted gas outlet at an upper portion thereof,

a filter mounted in the gas outlet for capturing the fluidizing mediums scattered from the fluidized bed,

a plurality of compartments attached to the gas outlet above the filter so that exhaust gas flows outwardly through the compartments,

closing means attached to the compartments to independently control communication between the compartment and outside of the furnace, respectively,

nozzles attached to the respective compartments between the closing means and the filter so that pressurized fluid is ejected to the filter for removing fluidizing mediums attached to the filter when the compartment is closed by the closing means,

a dispersion plate horizontally disposed inside the furnace body for separating an interior of the furnace body into an upper fluidizing chamber and a lower chamber, and

heat transfer tubes arranged in the fluidizing chamber to receive heat from the fluidized bed.

4,966,102

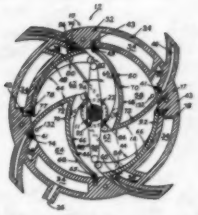
COMPRESSION/COMBUSTION ASSEMBLY

Joy P. Mulakken, 6149 Potrero Dr., Newark, Calif. 94560

Filed Feb. 7, 1989, Ser. No. 307,897

Int. Cl.[5] F02B *53/00*

U.S. Cl. 123—18 R 21 Claims



1. A compression/combustion assembly adaptable to be utilized either as a fluid compression device or as an internal combustion engine, comprising:

a chamber subassembly forming an elongated cylindrical volume about a central axis, said cylindrical volume having a plurality of extensions extending outwardly therefrom along the entire axial length thereof;

a plurality of vane subassemblies, equal in number to said extensions, adapted to mount within the chamber subassembly such that each vane subassembly independently pivots about its own pivot axis, each vane subassembly including a vane member forming a compression/combustion subchamber between said vane member and the surface of said cylindrical volume, each said compression/combustion subchamber being isolated from each other of said compression/combustion subchambers, and in the case of an internal combustion engine each said compression/combustion subchamber functioning to both compress and combust fuel therein, a portion of said vane member extending into a corresponding one of said extensions;

a rotor subassembly situated within said cylindrical volume and permanently isolated from each said compression/combustion subchamber such that the rotor subassembly is not exposed at any time to the contents of the compression/combustion subchambers, the rotor subassembly including a drive shaft aligned along said central axis, and a rotor blade mounted on said drive shaft, said rotor blade being formed such that the rotational position thereof corresponds to the pivotal position of each said vane members; and

port/valve means associated with said chamber subassembly to control inputs to and outputs from said subchambers in a manner corresponding to the rotational position of said rotor blade.

4,966,103

COMBUSTION SYSTEM FOR DUAL FUEL ENGINE

Frederick S. Schaub, Mt. Vernon, and Jesse G. Smith, Fredericktown, both of Ohio, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 9, 1989, Ser. No. 434,023

Int. Cl.[5] F02B *3/00*

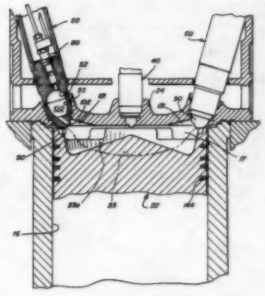
U.S. Cl. 123—276 40 Claims

1. In a dual gas-liquid fuel four cycle engine having a plurality of cylinders and wherein each cylinder is operatively connected thereto and each cylinder has a piston, two inlet valves, two exhaust valves and a first liquid fuel injector comprising:

at least one fuel torch cell operatively connected to at least one cylinder,

said torch cell having a torch cell nozzle at one end thereof and the other end having appropriate means to connect said torch cell to a fuel supply,

a second fuel injector mounted in said torch cell at a predetermined angle to an axis of said torch cell,
said torch cell defining an auto-ignition chamber,
said second fuel injector being in operative communication with said auto-ignition chamber by an injector nozzle



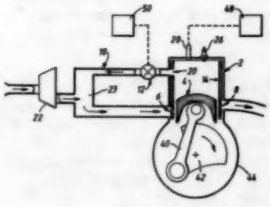
passageway, said injector nozzle passageway entering said auto-ignition chamber at a predetermined angle relative to said axis, and
a torch nozzle passage connecting said auto-ignition chamber with said cylinder at a predetermined angle to a top inner portion of a cylinder head.

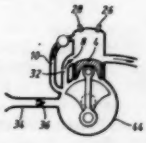
4,966,104

TWO-STROKE ENGINES

Giles E. Hundleby, Horsham, England, assignor to Ricardo Group PLC, Shoreham-by-Sea, England

Filed Jun. 26, 1989, Ser. No. 371,064
Claims priority, application United Kingdom, Jun. 30, 1988, 8815543
Int. Cl.[5] F02B *75/02*
U.S. Cl. 123—65 BA **10 Claims**





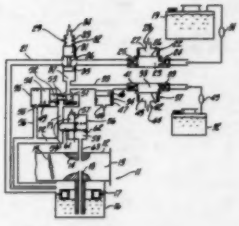
1. A two-stroke engine comprising a wall defining a cylinder, a piston reciprocally disposed within said cylinder, means defining an inlet port through which, in use, an inlet charge of air flows into said cylinder, means defining an outlet port through which, in use, the exhaust gas flows from said cylinder, means for injecting fuel into said cylinder and fuel control means for controlling the amount of fuel injected by said fuel injection means, said engine further including a vent passage communicating with the interior of said cylinder, first valve means which is arranged to control communication between the interior of said cylinder and said vent passage and is connected to be opened and closed at a predetermined point in the piston cycle, and a second valve means which is situated in said vent passage downstream of said first valve means and coupled to said fuel control means, said second valve means being a throttling valve which is arranged to be opened to an increasing extent to permit an increasing proportion of said inlet charge to be discharged through said vent passage as said fuel control means is operated to reduce the amount of fuel which is injected into said cylinder.

4,966,105

LUBRICATING OIL SUPPLY DEVICE FOR INTERNAL COMBUSTION ENGINE

Atsushi Mori, Iwata, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Nov. 21, 1984, Ser. No. 673,905
Claims priority, application Japan, Dec. 5, 1983, 58-228516; Dec. 5, 1983, 58-228517
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—73 AD **16 Claims**



1. In a fuel delivery system for a two-cycle internal combustion engine having an induction system for supplying at least an air charge to said engine, charge forming means for supplying a fuel charge to said engine, a source of lubricant, and lubricating means for delivering lubricant from said lubricant source to said engine, the improvement comprising means for varying the amount of lubricant delivered by said lubricating means in response to air flow through a portion of said induction system, said air flow though the portion of the induction system being sensed by a venturi section and a static pressure sensing device at the throat of the venturi section.

4,966,106

CAMSHAFT DRIVING ARRANGEMENT FOR DOUBLE OVERHEAD CAMSHAFT ENGINE

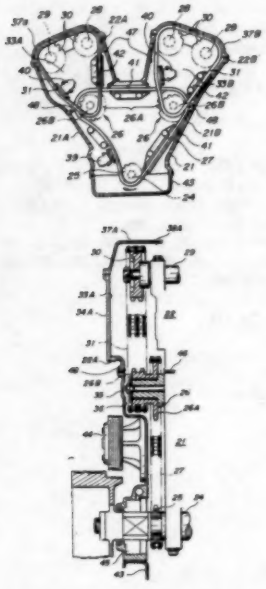
Tatsuo Aruga, Kawasaki, and Yoshio Iwasa, Nagareyama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 14, 1989, Ser. No. 450,510
Claims priority, application Japan, Dec. 21, 1988, 63-320593
Int. Cl.[5] F01L *1/02*
U.S. Cl. 123—90.31 **2 Claims**

1. In a DOHC engine, the DOHC engine having a cylinder block including two cylinder banks angularly disposed to each other, two cylinder heads mounted on the two cylinder banks, respectively, two pairs of camshafts, each pair being rotatably mounted to one of the two cylinder heads, and a crankshaft, a camshaft driving arrangement comprising:
two pairs of sprockets, each pair being mounted to the adjacent pair of camshafts;
two idler gears rotatably mounted to the cylinder banks, respectively;

a timing chain drivingly interconnecting the crankshaft and said two idler gears;

two camshaft driving chains, each interconnecting one of



said two idler gears and the adjacent two cam sprockets; and

a front cover so constructed and arranged as to conceal said two idler gears and said timing chain.

4,966,107

VALVE CLEARANCE ADJUSTMENT

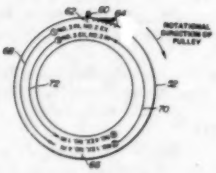
Minoru Imajo, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 190,857, May 6, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,125

Claims priority, application Japan, May 8, 1987, 62-69561[U]

Int. Cl.[5] F01L *1/20*

U.S. Cl. 123—90.45 **4 Claims**



3. A valve clearance adjustment apparatus for compensating for an operational deflection of a camshaft of a multicylinder internal combustion engine, said engine including respective intake and exhaust valves for each cylinder, a crankshaft, said crankshaft synchronously driving said camshaft to open said valves, and spring means for each valve to urge said valves to close, said adjustment apparatus comprising:

indicating means having identification means for indicating a fully closed position of each and every valve of at least one cylinder of said engine at which at least one other valve of the same cylinder is fully open,

wherein said each and every valve clearance in said at least one cylinder of said engine is adjusted when said valve is in said fully closed position so as to compensate for said camshaft deflections caused by a respective reaction force of said spring means.

4,966,108

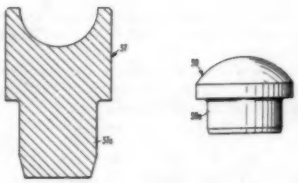
SINTERED CERAMIC BALL AND SOCKET JOINT ASSEMBLY

Joseph C. Bentz; Thomas M. Yonushonis; James W. Patten, all of Columbus, Ind., and Yuji Fujimoto, Yokohama, Japan, assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Apr. 28, 1989, Ser. No. 344,743

Int. Cl.[5] F01L *1/14;* **F16C** *11/00*

U.S. Cl. 123—90.51 **18 Claims**



1. A joint assembly for use in an internal combustion engine, said engine including a substantially spherical ball member and a complementarily shaped mating socket member, said ball member and said socket member being in highly loaded, sliding cont :t wherein contact stresses are between 80,000 psi and 120,000 psi, one of said ball member and said socket member being formed of a ceramic material sintered to a high density of at least 3.18 g/cm^3, and the other of said ball member and said socket member being formed of metal material wherein the ceramic -metal interface reduces wear of said joint assembly.

4,966,109

HYDRAULIC CONNECTING ROD

Pavo Pusic 164 McKinley Ave., East Hanover, N.J.; and Bozo Memed, Balda Mekisica 3, 50000 Dubrovnik, Yugoslavia both of Dubrovnik, Yugoslavia

Filed Apr. 5, 1989, Ser. No. 333,685

Int. Cl.[5] F02B *75/32*

U.S. Cl. 123—197 AB **20 Claims**

1. A hydraulic connecting rod for connecting an engine piston to an engine crankshaft, the hydraulic connecting rod comprising:

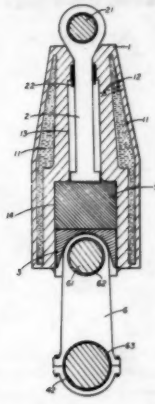
a housing, the housing having first and second cylinders formed therein, the first and second cylinders being in fluid communication with one another and each having a predetermined diameter, the diameter of the first cylinder being less than the diameter of the second cylinder;

a small piston, the small piston comprising a head portion and a rod portion, the head portion being slidably received within the first cylinder in the housing and the rod portion being slidable into and out of the housing, the rod portion having a first end connected to the head portion and a second end connected to the engine piston;

a large piston, the large piston having a piston head, the piston head being slidable received within the second cylinder;

a connecting rod connecting the large piston to the engine crankshaft;

the small piston and the large piston being spaced from one another so as to define a substantially fixed volume chamber bounded by the heads of the small and large piston and at least one of the first and second cylinders; and



an incompressible hydraulic fluid substantially filling the chamber so as to provide a fluid connection between the small piston and the large piston.

4,966,110

INTAKE AIR FLOW CONTROL APPARATUS OF INTERNAL-COMBUSTION ENGINE

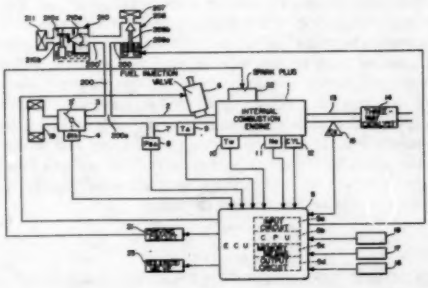
Yasunari Seki; Yuzuru Koike; Yosuke Tachibana, and Kiyoshi Tsukimura, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,844

Claims priority, application Japan, Oct. 31, 1988, 63-276912

Int. Cl.[5] F02M *23/06*

U.S. Cl. 123—327 **3 Claims**



1. An intake air flow control apparatus for an internal-combustion engine including a valve lift characteristic control means for variable control of lift characteristics of an intake valve or an exhaust valve of an internal-combustion engine, and a deceleration intake control means for controlling the quantity of intake air to be supplied at the downstream side of an intake throttle valve during the decelerating operation of said internal-combustion engine, said intake air flow control apparatus comprising: an intake control characteristic change means for changing control characteristics of said deceleration intake control means in response to said value lift characteristic control.

4,966,111

FUEL SUPPLY CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

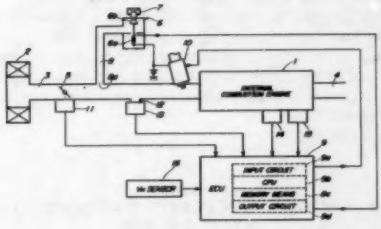
Sachito Fujimoto; Takuya Sugino; Shunji Takahasi, and Makoto Hashiguchi, all of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jul. 24, 1989, Ser. No. 384,566

Claims priority, application Japan, Aug. 2, 1988, 63-192946

Int. Cl.[5] F02D *41/16*

U.S. Cl. 123—339 **8 Claims**



1. In a fuel supply control system for an internal combustion engine, said engine being installed on an automotive vehicle, said automotive vehicle having a driving system connected to said engine, wherein when said engine is at idle, an amount of fuel to be supplied to said engine is determined depending on operating conditions of said engine, a correction value is determined based on a difference between a desired idling engine rotational speed and an actual engine rotational speed, and the determined amount of fuel is corrected by the determined correction value to thereby supply a corrected amount of fuel to said engine,

the improvement comprising:

detecting means for detecting whether said engine is engaged with said driving system of said automotive vehicle, and

correction value-changing means for setting a rate of change in said correction value relative to a change in said difference to a greater value when said detecting means detects that said engine is not engaged with said driving system, and to a smaller value when said detecting means detects that said engine is engaged with said driving system.

4,966,112

METHOD FOR ADJUSTING IDLING RPM OF ENGINE

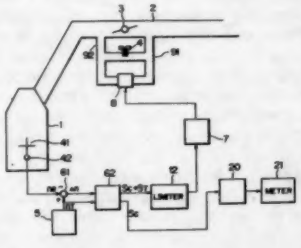
Setsuhiro Shimomura, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 1, 1989, Ser. No. 401,681

Claims priority, application Japan, Sep. 8, 1988, 63-225383

Int. Cl.[5] F02M *3/00*; F02D *41/16*

U.S. Cl. 123—339 **13 Claims**



1. A method of adjusting an idling speed of an internal com-

bustion engine having an intake passage, a throttle valve in the intake passage, first and second bypass passages each separately communicating with the intake passage so as to bypass the throttle valve, a flow rate control means for controlling the flow rate through the first bypass passage, and an adjustable device for adjusting the flow rate through the second bypass passage, the method comprising the steps of:

generating, as a varying adjustment signal, a target signal and a correctional signal, the target signal representing a target engine idling speed, and the correction signal representing a difference between a detected engine idling speed and the target engine idling speed;

controlling said flow rate control means in accordance with the generated varying adjustment signal; and

adjusting said adjustable device so as to decrease an absolute value of said correction signal, said adjusting step being performed at a time when said controlling step is performed.

4,966,113

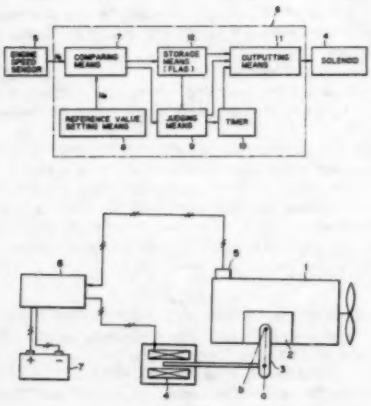
REVERSE ROTATION PREVENTING DEVICE FOR DIESEL ENGINE

Yoshiaki Fujimoto, Himeji, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 20, 1989, Ser. No. 438,026

Int. Cl.[5] **F02B** *77/08*; **F02D** *31/00*; **F02M** *63/02*

U.S. Cl. 123—359 **1 Claim**



1. A reverse rotation preventing device for a Diesel engine, comprising an engine stopping means for stopping said engine, an engine speed detecting means for detecting a speed of said engine, a comparing means for comparing a detection value developed from said engine speed detecting means with a reference value which is set in advance as a low engine speed with which stopping of said engine may be resulted, a judging means for judging in accordance with the detection value from said engine speed detecting means whether or not said engine is in a deceleration tendency, an outputting means operable in accordance with a result of the judgement by said judging means and a result of the comparison by said comparing means for outputting an engine stopping signal to said engine stopping means when the detection value is lower than the reference value and said engine is in a deceleration tendency, and a timer means for interrupting the outputting of the engine stopping signal after lapse of a predetermined interval of time.

4,966,114

INTERNAL COMBUSTION ENGINE THROTTLE CONTROL

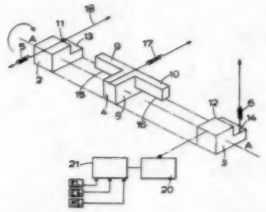
Mark J. Basten, West Midlands, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed Dec. 4, 1989, Ser. No. 445,183

Claims priority, application United Kingdom, Dec. 16, 1988, 8829403

Int. Cl.[5] **F02D** *7/00*

U.S. Cl. 123—396 **8 Claims**



1. A vehicle internal combustion engine throttle control comprising an accelerator pedal, a throttle valve means, a rotatable shaft for operating said valve means, a motor device operable in response to signals from electronic means in accordance with at least one appropriate parameter, and a control transmission mechanism for determining what extent of a given movement of the accelerator pedal should be transmitted to said valve means, wherein said transmission mechanism comprises an interlock member fast with said rotatable shaft, resilient means normally urging said shaft and said interlock member in a first direction through an angular distance to open said valve means, a first input member, a second input member, first coupling means coupling said first input member to said accelerator pedal, said ... input member being movable between a retracted position and an advanced position in response to movement of said pedal, second coupling means coupling said second input member to said motor device, said second input member being movable between a retracted position and an advanced position, first means defining a first operative co-operation between said first input member and said interlock member with respect to said retracted position of said first input member, and second means defining a second operative co-operation between said second input member and said interlock member with respect to said retracted position of said second input member, said first means and said second means being so constructed and arranged that said angular distance through which said interlock member is movable by said resilient means is determined by the one of said first and second means defined by the operative position of the said one input member which has moved by the smaller angular distance with respect to the retracted position thereof.

4,966,115

CONTROL MEANS OF INTERNAL COMBUSTION ENGINE FOR MARINE PROPULSION

Kazumasa Ito, and Yoshide Hirano, all of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 8, 1988, Ser. No. 229,924

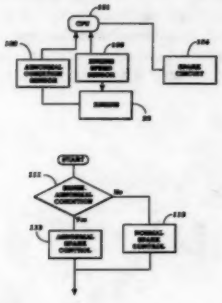
Claims priority, application Japan, Aug. 8, 1987, 62-198727

Int. Cl.[5] **F02P** *5/145*

U.S. Cl. 123—418 **15 Claims**

1. In a spark control for an internal combustion engine comprising spark timing means for firing a spark plug in accordance with a first spark advance curve in relation to an engine characteristic at a given speed range and a second, different advance curve in relation to said engine characteristic and

within the given speed range, one of said advance curves providing a fixed spark advance and means for selecting which



of said advance curves control spark timing within the given speed range.

4,966,116

ELECTRONIC CONTROL IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

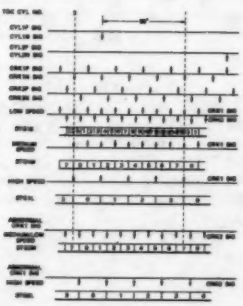
Sakurai Hidetoshi, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,873

Claims priority, application Japan, May 9, 1988, 63-112240

Int. Cl.[5] F02P 9/00

U.S. Cl. 123—418 **38 Claims**



1. An electronic control ignition system for an internal combustion engine in which crank angle signals, each generated every time the crank shaft of the internal combustion engine rotates by a predetermined angle, are detected and an ignition timing is controlled based on the detected crank angle signals, the system comprising:

primary pulse generating means for generating a first train of pulses, each pulse having a fall time and a rise time and being generated every time said crank shaft rotates by said predetermined angle;

secondary pulse generating means for generating at least one second pulse train, subsequent to said first train of pulses, wherein each said second pulse train generated is sequentially delayed in phase with respect to an immediately previously generated pulse train;

speed detection means, operatively connected to said primary and secondary pulse generating means, for detecting rotational velocity of said engine, said speed detecting means further outputting a signal indicating that said rotational velocity is operating in one of either a first velocity within predetermined velocity range, a second velocity above said predetermined velocity range, and a third velocity below a predetermined velocity range;

error detection means, operatively connected to said primary and secondary pulse generating means, for detecting errors in said generated pulse trains and for outputting a signal indicating errors in said generated pulse trains; and

selectable switching means, including a plurality of switches, operatively connected to said primary pulse generating means, said secondary pulse generating means, said error detection means, and said speed detection means, for selectively operating certain of said plurality of switches to continuously detect at least one of said first and second pulse trains to thereby continuously monitor and control ignition timing of said internal combustion engine, said selective operation of certain of said plurality of switches being responsive to said output signal of said speed detection means and said output signal of said error detection means.

4,966,117

SYSTEM AND METHOD FOR CONTROLLING IGNITION TIMING FOR VEHICULAR INTERNAL COMBUSTION ENGINE

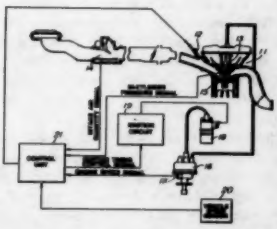
Yoshihisa Kawamura, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Mar. 28, 1989, Ser. No. 330,343

Claims priority, application Japan, Mar. 29, 1988, 63-41453[U]

Int. Cl.[5] F02P 23/00, 5/00

U.S. Cl. 123—425 **14 Claims**



1. A system for controlling an ignition timing for a vehicular internal combustion engine, comprising:

(a) first means for detecting engine operating conditions;

(b) second means for setting a basic ignition timing value according to the engine operating conditions;

(c) third means for detecting at least one of the occurrence of engine knocking and a position at which an engine combustion pressure attains a maximum;

(d) fourth means for calculating a feedback correction quantity for the ignition timing responsive to detection of at least one of the occurrence of engine knocking and attaining of the maximum combustion pressure;

(e) fifth means for detecting a vehicle speed;

(f) sixth means for setting an advance angle limit value for the feedback correction quantity according to the detected vehicle speed; and

(g) seventh means for determining the ignition timing by addition of the feedback correction quantity to the basic ignition timing angle value.

4,966,118

FUEL INJECTION CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

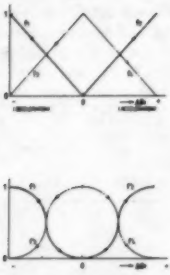
Tomiya Itakura, and Hiroshi Kamifuji, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Ibaraki, both of, Japan

Filed Oct. 3, 1989, Ser. No. 416,408

Claims priority, application Japan, Oct. 14, 1988, 63-257157

Int. Cl.[5] F02D *41/10, 41/12;* F02M *51/00*

U.S. Cl. 123—492 **9 Claims**



1. A fuel injection control apparatus for an internal combustion engine, comprising:

fuel injecting means for supplying fuel to the engine in response to a fuel injection pulse applied thereto;

sensing means for detecting fundamental parameters representing the operational condition of the engine to produce signals corresponding to detected amount of the parameters, the fundamental parameters including at least an acceleration or deceleration required to be effected by the engine; and

controlling means, including a microprocessor for executing a predetermined processing in response to the signals of said sensing means, for producing a basic fuel injection pulse, a pulse width of which is determined based on the fundamental parameters, and correcting the pulse width of the basic fuel injection pulse in accordance with the degree of the acceleration or deceleration required thereby to provide the fuel injection pulse to said fuel injecting means,

characterized in that

the microprocessor is provided with membership functions varying with respect to the acceleration or deceleration which determine a correction coefficient for correcting the basic fuel injection pulse on the basis of the degree of the acceleration or deceleration required in accordance with fuzzy reasoning using the membership functions.

4,966,119

FUEL INJECTION CONTROL DEVICE FOR USE IN AN ENGINE

Masaki Mitsuyasu, and Naoyuki Tsuzuki, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jan. 10, 1989, Ser. No. 295,296

Claims priority, application Japan, Jan. 12, 1988, 63-3049; Jul. 8, 1988, 63-168670

Int. Cl.[5] F07M *39/00*

U.S. Cl. 123—498 **26 Claims**

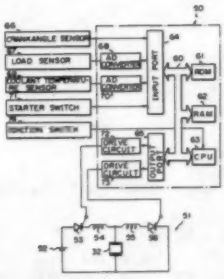
1. A fuel injection control device of an engine having a source of electric power, an ignition switch, a crankshaft, at least one cylinder, and at least one fuel injector, the fuel injection control device comprising:

a piezoelectric element for controlling an injection of fuel from said fuel injector;

drive means having at least one LC resonant circuit for selectively charging said piezoelectric element with electrons and discharging electrons charged in said piezoelectric element to drive said piezoelectric element;

regular injection control means actuated in response to engine operating parameters to control said drive means for driving said piezoelectric element to carry out a regular injection of at least one pulse of a predetermined amount of fuel by said fuel injector, and

dummy drive control means actuated to control said drive means for performing a number, equal to at least one, of



cycles of charging and discharging of said piezoelectric element to increase the charge difference between the charged and discharged states of the piezoelectric element without causing an injection of a predetermined amount of fuel, prior to an actuation of the regular injection control means, sufficient to assure a charge state in said piezoelectric element at the time of actuation of the regular injection control means that will enable the regular injection control means to carry out said regular injection of at least one pulse of a predetermined amount of fuel.

4,966,120

FUEL INJECTION SYSTEM ASSEMBLY

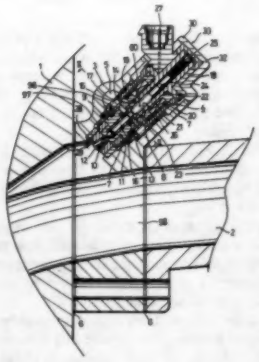
Hideki Itoh, and Hitoshi Takeuchi, both of Obu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu, Japan

Filed Jul. 28, 1988, Ser. No. 225,724

Claims priority, application Japan, Jul. 29, 1987, 62-189795; Jul. 30, 1987, 62-191133; Jul. 31, 1987, 62-193369; Feb. 5, 1988, 63-26307

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—516 **11 Claims**



1. An assembly for a fuel injection system for use with an internal combustion engine having a plurality of cylinders, said

assembly being adapted to be mounted on a cylinder head of said engine, said assembly comprising:

(a) a fuel injection system component having:

a plurality of air passages extending through said component;

a plurality of injector seats each communicating with one of said air passages; and

a fuel passage communicating with said injector seats; and

(b) a plurality of injectors mounted on said injector seats, each injector having:

a valve formed at a bottom portion of said injector communicating with one of said air passages;

a fuel storage chamber formed within said injector at an upper part thereof and communicating with said valve;

a fuel inlet communicating with said valve and said fuel passage; and

a vapor discharge passage located above said fuel inlet and communicating with said fuel storage chamber and said fuel passage, wherein said vapor discharge passage inclines upwardly toward said fuel passage, whereby fuel vapor fed through said fuel inlet or generated in said injector is once stored in said fuel storage chamber and is then discharged from said fuel storage chamber through said vapor discharge passage into said fuel passage so as to prevent vapor lock of said injector system.

4,966,121

APPARATUS FOR ENHANCING ENGINE PERFORMANCE

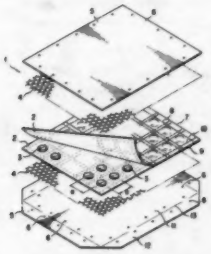
Fusamitsu Koga, 45-4 Takada, Maeharu-machi, Itoshima-gun, Fukuoka-ken, Japan

Filed Dec. 1, 1989, Ser. No. 444,283

Claims priority, application Japan, Jun. 27, 1989, 1-162735

Int. Cl.[5] F02M *33/00*

U.S. Cl. 123—536 **13 Claims**



1. An engine performance enhancing apparatus, comprising a plurality of disklike copper pieces arranged lattice wise and interposed between two cloths, a sheet of copper mesh superposed on the opposite outer surface of each of said cloths, and an aluminum sheet superposed on the opposite outer surface of each of said sheets of copper mesh and fastened.

4,966,122

BYPASS THROTTLE CONTROL FOR A MOTOR VEHICLE

Udo Frinzel, Oberkotzau, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

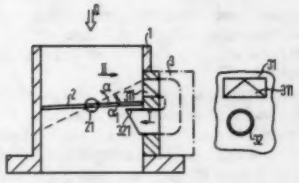
Filed Mar. 23, 1990, Ser. No. 497,928

Claims priority, application European Pat. Off., Apr. 13, 1989, 89106653.2

Int. Cl.[5] F02M *3/06*

U.S. Cl. 123—585 **8 Claims**

7. Bypass throttle control for a motor vehicle having a throttle valve connector with a throttle valve pivotally seated in the throttle valve connector and at least two connecting openings in a wall of the throttle valve connector for the connection of an idling control, these connecting openings located on either side of the throttle valve in reference to a flow direction for a throttle valve in a closed position, comprising: one connecting opening of the two openings being a critical opening and located at least partly in a section of the wall that is limited by the closed position and by an intermediate position of the throttle valve; the intermediate position being at a maximum of 30° from the closed position; and the critical opening having an open cross section such that the throttle



valve overruns no limiting edge of this open cross section that extends parallel to a marginal edge of the throttle valve during an opening motion of the throttle valve during an between the closed position and the intermediate position, the open cross section of the critical opening being a rectangular area less the area of a triangle, whereby the rectangular area has two limiting edges perpendicular to a longitudinal axis of the throttle valve connector and one side of the triangle is that limiting edge of the triangular area that lies closest to the closed position of the throttle valve.

4,966,123

APPARATUS FOR THE MIXING OF GAS OR GASES WITH AIR IN A CONTROLLABLE RATIO FOR A COMBUSTION-ENGINE

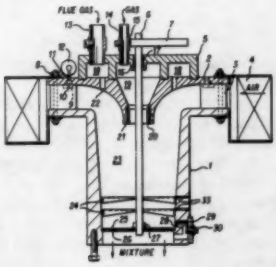
Paul M. Hofmeester, Hoftech Metaalbewerking en Apparatenbouw Postbus 35043, 3005 DA Rotterdam, Netherlands

Continuation of Ser. No. 187,153, Apr. 28, 1988, abandoned. This application Oct. 19, 1989, Ser. No. 423,750

Claims priority, application Netherlands, Apr. 28, 1987, 8700996

Int. Cl.[5] F02M *29/02*

U.S. Cl. 123—592 **13 Claims**



1. Apparatus for forming a homogenous mixture of air and combustion gas to be supplied to a combustion engine in a controllable mixing ratio which apparatus comprises:

(a) a mixer body formed of an elongated cylindrical mixer house, having a first end and a second end, for mixing said air and combustion gas; a vortex flange member spaced from said first end for introducing said air and combustion gas into the interior of said mixer house; and a gas inlet

flange member on said vertex flange member remote from said mixer house for receiving at least said combustion gas;

(b) a plurality of air-guiding nozzles spaced equally around the circumference of said first end between said vortex flange and said first end for directing air radially into said mixer house at an angle, each of said air-entry nozzles being pivotally mounted on a pivot-shaft extending between said first end and said vortex flange so that said angle is adjustable to control the angle of air fed into said mixer house and provide a spiralling air stream circulating around the interior of said mixer house toward said second end;

(c) combustion gas inlet means comprising a centrally positioned opening in said vortex flange for introducing said combustion gas into the central portion of said mixer house;

(d) gas mixing means intermediate said centrally positioned opening and said second end for forming a homogenous mixture of said spiralling air and said combustion gas; and

(e) throttle valve means intermediate said gas mixing means and said second end for controlling the volume of said homogenous gas mixture to be supplied to said engine.

4,966,124

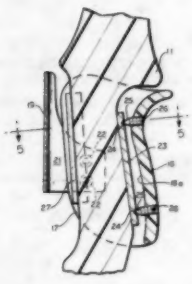
GRIP ASSEMBLY FOR ARCHERY BOW

Michael R. Burling, 7611 Holstein Rd., Toledo, Ohio 43617, assignor to Michael R. Burling, Toledo, Ohio

Filed Apr. 18, 1988, Ser. No. 182,442

Int. Cl.[5] F41B 5/00

U.S. Cl. 124—23.1 **18 Claims**



1. In an archery bow having a central riser element and upper and lower limbs extending therefrom in the plane of the bow, the combination therewith of:

a grip assembly comprising a hand grip element having a back surface nearest the archer and depending sides providing a clevis arrangement extending around opposite sides of the riser element, and a U-shaped shield plate having spaced-apart legs, at least one of said legs being secured to one of the sides of the hand grip element, said shield plate and hand grip element together encircling the riser element shielding the archer's hand from the riser element, and

a low friction connection means between said hand grip and bow riser elements comprising a pivot member connected to one of said elements and a pivot seat connected to the other of said elements, said pivot seat and said pivot member are disposed between the riser element and said back surface of the hand grip element, said connection means being characterized by providing a low friction contact to prevent imparting torque from the hand grip element to the riser element.

4,966,125

BARBEQUE KETTLE

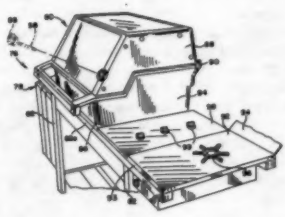
James C. Stephen, Arlington Heights; Erich J. Schlosser, Lindenhurst, and Andrzej Leja, Palatine, all of Ill., assignors to Weber-Stephen Products Co., Des Plaines, Ill.

Continuation of Ser. No. 69,765, Jul. 6, 1987, Pat. No. 4,777,927, which is a continuation-in-part of Ser. No. 759,531, Jul. 26, 1985, Pat. No. 4,677,964. This application Sep. 23, 1988, Ser. No. 249,364

The portion of the term of this patent subsequent to Jul. 7, 2006, has been disclaimed.

Int. Cl.[5] F24B 3/00

U.S. Cl. 126—25 R **3 Claims**



1. In combination with a grill having a fire box and a cover with a combustion source in said fire box and a food support grid above said combustion source, the improvement of a thermometer removably supported on said cover for sensing the internal temperature in said fire box, said thermometer having a piercing portion extending through said cover, said cover having an opening with frictional gripping means between said cover and said thermometer to releasably retain the thermometer in the opening, said thermometer being removable from said cover and insertable into food being cooked to sense the internal temperature of the food.

4,966,126

ASH-COLLECTING PAN AND VENTILATION ADJUSTING DEVICE FOR A BARBECUE SET

Hsi-Liang Wu, 263, Jin Shui Street, Hsinchu, Taiwan

Filed Oct. 25, 1989, Ser. No. 426,232

Int. Cl.[5] F23J 1/00

U.S. Cl. 126—25 R **1 Claim**

1. An ash-collecting pan and ventilation adjusting device in combination with a barbecue set, comprising:

a body portion of the barbecue set having a flat bottom with a plurality of holes and three L-shaped flanges spaced 90° from one another about the outer circumference of said flat bottom, each of said L-shaped flanges forming an inwardly facing groove;

an ash-collecting pan including an inner pan, and an outer pan nested with said inner pan, and having a given height, the wall of each of said pans having several corresponding ventilation apertures, said inner pan being slightly smaller than said outer pan such that it can nest inside said outer

pan, the upper edge of said outer pan including two opposing parallel straight edge portions removably received in two opposing grooves of said inwardly facing grooves, respectively, the bottom center of said inner pan having a rectangular hole therein with a predetermined diagonal dimension, and the bottom center of said outer pan having a round hole therein which is larger in diameter than the diagonal dimension of said rectangular hole; and

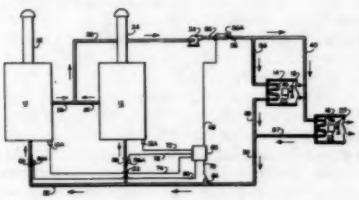
a handle made of an elongate plate, of which one end is formed into a ring-shaped handle and disposed at an angle relative to the other end thereof, said other end having a screw mounted thereto, the screw having a rectangular portion adapted to pass through the round hole of said outer pan and mate with the rectangular hole of said inner pan, a nut being received on said screw so as to cause said handle, said inner pan and said outer pan to be assembled together as an ash-collecting pan adapted to be received in said grooves formed by said three L-shaped flanges; such that when said ash-collecting pan is inserted into said three L-shaped flange plates on the bottom of said body portion of said barbecue set, said inner pan can be turned by operating said handle so as to adjust the size of said ventilation apertures for regulating the air supply to said barbecue set during cooking.

4,966,127

METHOD AND APPARATUS FOR SAVING ENERGY IN DIRECT FIRED BOILERS

George Martinez, Jr., P.O. Box 1141, Gonzales, La. 70737

Filed Jan. 19, 1988, Ser. No. 145,554
Int. Cl.[5] F24H *1/00*
U.S. Cl. 126—362 **24 Claims**



1. A method for reducing the amount of energy consumed in heating a building with a direct fired boiler having a supply reheat water line and a return reheat water line comprising:

a. operating the direct fired boiler at full capacity until the supply reheat water temperature reaches a preset temperature, and

b. varying the total water flow in the return reheat water line and the supply reheat water line to maintain the temperature of the water in the return reheat water line at a preset valve.

4,966,128

GAS SOLDERING IRON

Chin-Fu Wang, No. 2, Sublane 10, Lane 136, Sec. 3, Chung Shan Road, Chung Ho City, Taipei Hsien, Taiwan

Filed Aug. 3, 1989, Ser. No. 388,875
Int. Cl.[5] B23K *3/00*
U.S. Cl. 126—414 **4 Claims**

1. A gas soldering iron, including

a gas cylinder, having a tubular body comprising a gas filling mechanism for filling therein of gas;

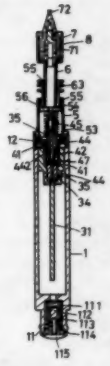
a lower holder plate mounted on said gas cylinder at the top, comprising at the top a pair of symmetric tracks, a pair of symmetric notches and a pair of symmetric stop pins;

a T-shaped mechanism for gas inlet control, having a tubular body comprising an outer thread and being fixedly set in said lower holder and connected thereto by means of screw joint;

an elongated movable conduit tube in said T-shaped mechanism, said movable tube having mounted thereon at the top a switching element, a gas jet cap, a spring and a revolving knob to control gas flow rate;

an upper holder plate having a tubular body comprising several air holes at the top, an inner thread, a track at the bottom end to match with said lower holder plate for moving therealong of said switching element;

a metal tubular element having outer thread at the bottom end for connection with the inner thread of said upper



holder plate, a boring bore through which gas is ejected, a plurality of radiator fins mounted thereon to help distribution of heat energy;

a cap-shaped soldering head having set therein an instantaneously heating asbestos, and comprising a plurality of side windows and a soldering head at the top;

an ignitor detachably mounted on said cap-shaped soldering head, comprising a friction wheel, a flint, and a spring;

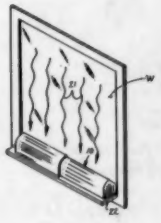
characterized in that when said revolving knob is turned on, the gas will be released from said gas cylinder to produce flame by means of the operation of said ignitor, so as to burn hot said soldering head for performing soldering process.

4,966,129

WINDOW INSULATING DEVICE

Gregory J. Curtis, Rt. 3, Box 372F, Little Rock, Ark. 72211

Filed Aug. 21, 1989, Ser. No. 396,315
Int. Cl.[5] E04B *1/76*
U.S. Cl. 126—430 **1 Claim**



1. A window insulating device in combination with a transparent window defined by a perimeter frame in surrounding relation to the window and a ledge member projecting coex-

tensively with the lowermost edge of the window and orthogonally relative to the lowermost edge of the window, the device comprising a first elongate member telescopingly receiving a second member, each first and second elongate member including a rear edge positioned adjacent the window within the perimeter frame, and

the device defining a trough when positioned on the ledge adjacent the window to capture descending cold air therewithin, and

wherein each first and second elongate member includes a respective first and second end wall, wherein each first and second end wall is defined by the respective rear edge, wherein each first and second end wall includes a forward first and second edge defined by a generally inverted "J" configuration, and

wherein each first and second elongate member includes a forward wall of a generally inverted "J" shaped cross-sectional configuration, wherein the first and second walls are spaced above and forwardly of a respective rear edge of each respective first and second end wall, and

wherein the first elongate member includes an upper and lower channel integrally formed to an upper and lower end edge of the first forward wall for receiving a respective first upper and lower edge within each channel, and

wherein the first forward wall is defined by a rear surface of a complementary configuration substantially equal to that defined by a forward surface of the second forward wall, and

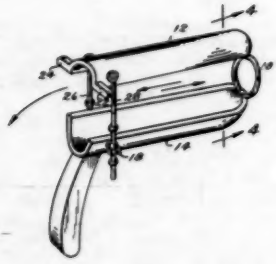
wherein each interior surface of the respective first and second forward walls includes a respective first and second flexible transparent envelope mounted thereon, the first and second envelope including a heat absorbing gel material therewithin.

4,966,130

ONE-PIECE DISPOSABLE SPECULUM

David H. Montaldi, 2358 Howell Mill Rd., NW., Atlanta, Ga. 30318

Filed Jan. 26, 1990, Ser. No. 470,574
Int. Cl.[5] A61B 1/30
U.S. Cl. 128—17 **3 Claims**



1. A one piece disposable speculum comprising:

a pair of elongated members privotally joined together by a central ring;

a handle formed at an one end of one of the elongated members distal from the central ring for urging the speculum into a body cavity; and

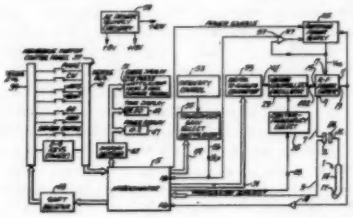
adjustable support means attached to the distal end of the elongated members for holding the elongated members in an adjustable spaced-apart manner.

4,966,131

ULTRASOUND POWER GENERATING SYSTEM WITH SAMPLED-DATA FREQUENCY CONTROL

Richard B. Houghton, Irvine, and Dean C. Obray, Manhattan Beach, both of Calif., assignors to Mettler Electronics Corp., Anaheim, Calif.

Filed Feb. 9, 1988, Ser. No. 154,180
Int. Cl.[5] A61H 1/00
U.S. Cl. 128—24 A **18 Claims**



10. Apparatus for supplying electrical power to an ultrasound-power generating crystal that has a pair of excitation electrodes and that is subjected to varying acoustic loads, which comprises:

switching circuit means for generating electrical power for the crystal and having first and second inputs and an output, and including active devices that switch on and off at a rate determined by the frequency of an oscillating signal applied to the first input, circuit means cooperating with the active devices to energize the crystal with the electrical power via a connection between the output and the excitation electrodes for controlling the level of electrical power supplied to the crystal in response to the magnitude of a variable supply voltage applied to the second input, and means for producing a current-representing signal representative of the magnitude of current supplied to energize the crystal;

sampled-data means for controlling the frequency of the oscillating signal, the sampled-data means including timing means for defining alternating sample and hold timing intervals, means for producing a frequency-control signal having a magnitude that varies during each sample interval and that remains essentially constant during each hold interval, means for supplying the oscillating signal to the first input of the switching circuit means, which includes variable-frequency oscillator means that oscillates at a frequency determined by the frequency-control signal, wherein the means for producing the frequency-control signal includes peak-detecting means operative during each sample interval for recording the magnitude of the frequency-control signal that corresponds to a peak in the current-representing signal so that throughout the ensuing hold interval the recorded peak value determines the frequency of the oscillating signal.

4,966,132

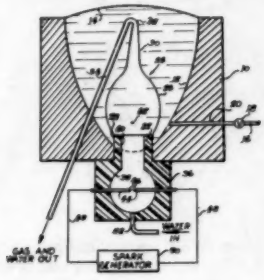
REMOTE SPARK SHOCK WAVE GENERATOR

Christopher Nowacki, Long Grove, and Alfred G. Brisson, Kildeer, both of Ill., assignors to Northgate Research, Inc., Arlington Heights, Ill.

Filed Dec. 1, 1988, Ser. No. 278,368
Int. Cl.[5] A61B 17/22
U.S. Cl. 128—24 A **9 Claims**

1. Apparatus for generating a shock wave comprising an upwardly opening truncated ellipsoidal reflector having its vertex at the lowest portion and opposite the open end, said reflector having first and second focus points, said first focus point being within said reflector relatively adjacent said vertex, said second focus point being disposed beyond said open end, said reflector being adapted to be pressed against a living

body with said second focus point coincident with a concretion such as a kidney stone in said living body, an insulating enclosure disposed adjacent said reflector and having a cavity therein adjacent said vertex and opening into said reflector facing said first focus point, means providing a spark gap



within said cavity, said reflector and said cavity having a liquid such as water therein, and means for generating a spark across said spark gap, such spark producing a shock wave in said cavity which passes from said cavity to said first focus point and is focused by said reflector on the concretion at the focus point.

4,966,133

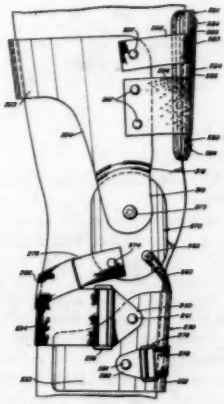
KNEE BRACE FOR CONTROL OF LIGAMENT STABILITY

James H. Kausek, 31 Stanwood Rd., Swampscott, Mass. 01907

Filed Sep. 8, 1988, Ser. No. 241,588

Int. Cl.[5] A61F *5/00*

U.S. Cl. 128—80 C **26 Claims**



1. A knee brace comprising:

an upper cuff positionable above the knee and a lower cuff positionable below the knee;

means for attaching each of the upper and lower cuffs to the leg;

a lateral hinge for preventing medial-lateral displacement of the upper and lower cuffs, the hinge having upper and lower hinge arms and at least one pivot point positionable adjacent the lateral side of the knee;

each of the upper and lower cuffs being shaped to conform to the leg and having medial and lateral portions;

means for connecting the upper hinge arm to the lateral portion of the upper cuff and the lower hinge arm to the lateral portion of the lower cuff;

a medial plate to stabilize the brace positionable at the medial side of the knee and having an inner surface for engaging the medial side of the knee; and

means for connecting the medial plate to each of the upper and lower cuffs, said connecting means including a pivotal connecting means between the medial plate and medial portion of the upper cuff to provide a medial point of articulation from which the plate pivots in a substantially anterior-posterior direction, and a means connecting the medial plate and lower cuff for restraining anterior movement of the tibia with respect to the femur including an anterior strap extending from the medial plate to the lower cuff and a posterior strap extending from the medial plate to the lower cuff;

wherein the upper and lower cuffs provide anteriorposterior stability to the knee joint and the lateral hinge and medial plate provide medial-lateral stability.

4,966,134

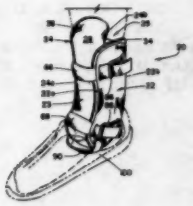
ANKLE PROTECTOR

Jeffrey L. Brewer, 2602 Sandia, Nacogdoches, Tex. 75961

Continuation of Ser. No. 17,929, Feb. 24, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 346,372

Int. Cl.[5] A61F *5/37, 5/04*

U.S. Cl. 128—80 H **5 Claims**



1. A brace for the ankle joint of a lower leg and foot of a person, comprising:

first and second elongate support members having anterior, posterior, superior and inferior margins and adapted to receive respectively the lateral and medial aspects of the leg of a person, each member having a transversely arcuate inner face and an upper and a lower portion,

first and second high surface friction resiliently compressible pad members substantially co-extensive respectively with said first and second support members and detachably affixable to the inner face of such first and second support members, respectively,

means on the inner faces of said support members, cooperative with means on said resilient pad members, for detachably affixing said first and second pad members to said first and second support members, respectively,

each said upper and lower portion having a longitudinal axis inclined laterally and anteriorly a minor degree from normal, said axes intersecting such that such intersection defines laterally- and anteriorly-included major obtuse angles of substantially similar obtuse degree, the axial distance from said intersection to said inferior margin of each said lower portion being smaller than the axial distance from said intersection to said superior margin of said upper portion,

each said lower portion including, proximate the inferior margin thereof, means for fixing a heel strap thereat, each said lower portion further including, between said intersection and said heel strap fixing means, means for attaching ankle strap and fastening means,

each said upper portion including remote from said intersec-

tion and between said intersection and said superior margin, means for attaching a leg strap and fastening means,

a flexible, inelastic heel strap adjustably fixed to said heel strap fixing means for inferiorly interconnecting the lower portions of said first and second support members at the inferior margins thereof, for tensioned contact with the heel when said lower leg is received, such that such heel strap conforms snugly to the curvature of the sole of the heel,

a flexible, in elastic adjustable ankle strap and fastening means attached to said lower portion attaching means and interconnecting the lower portions of said first and second support members, anteriorly, substantially transversely to said longitudinal axis of said lower portion, and, posteriorly, substantially transversely to normal, for tensioning said lower portions and said pad members onto said lower leg proximate said malleoli firmly snugly against said malleoli when said lower leg is received, and

a flexible, inelastic adjustable leg strap and fastening means attached to said upper portions attaching means and interconnecting the upper portions of said first and second support members, anteriorly, substantially transversely to said longitudinal axis of said upper portion, and, posteriorly, substantially transversely to normal, for tensioning said upper portions and said pad member onto said lower leg distally above said intersection when said lower leg is received, to stabilize said first and second members above the ankle joint.

4,966,135

ORTHOPEDIC CAST COVER AND METHOD OF MANUFACTURE

R. Bruce Renfrew, 601 Barneson Ave., San Mateo, Calif. 94402

Filed Oct. 25, 1988, Ser. No. 262,450
Int. Cl.[5] A61F *13/00, 5/04, 5/10*; A41D *19/00*
U.S. Cl. 128—82 **7 Claims**

1. A watertight, protective limb cover comprising an elongate, integral polyurethane film enclosure for receiving the limb to be protected, said enclosure having a front side and a back side, said front and back sides connected together to form a closed end and a receiving end, said receiving end formed from a single polyurethane film fold connecting said front and back sides of said enclosure and adapted to have an opening created along said fold with a diameter smaller than the diameter of the receiving end and configured to form a watertight seal between the limb to be protected and the external environment, said closed end formed by a continuous seal between the polyurethane forming said front and back sides.

4,966,136

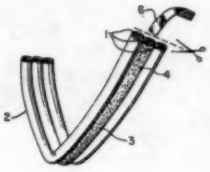
ORTHOPEDIC SUPPORT DEVICE

Norman R. Bates, 89 Niagara Street, Toronto, Ontario, Canada

Filed Apr. 6, 1989, Ser. No. 334,188
Claims priority, application Canada, Sep. 2, 1988, 576495
Int. Cl.[5] A61H *1/02*
U.S. Cl. 128—87 R **6 Claims**

1. In an orthopedic support device comprising at least one resilient pad having a length, thickness, and width which is covered with a fabric and a pair of ends which are to be fastened together, whereby the support device may be wrapped around a body at a desired location and the ends of said device are fastened together to support the body at that location,

the improvement wherein said device is provided with a lengthwise-extending first strip of a hook-and-pile closure material, wherein said first strip of closure material is sewn



to an exterior surface of said resilient pad along the entire length of said pad, thereby allowing said device to be cut at any selected position along its length so as to provide a support device of any desired shorter length and a second strip of a complementary hook-and-pile closure material for releasably fastening the ends of said device together by attachment to exposed parts of the first strip of closure material on the respective ends of said device.

4,966,137

SPLINT SYSTEM

Mark A. Davini, 382 Boston Turnpike, Suite 101, Shrewsbury, Mass. 01545

Filed Sep. 19, 1989, Ser. No. 410,360
Int. Cl.[5] A61F *5/04, 5/37*
U.S. Cl. 128—87 R **7 Claims**

1. Splint system for the treatment of carpal tunnel syndrome in a patient comprising:

(a) a clamp formed from a generally rectangular sheet of semi-rigid material and formed into a generally tubular shape having four generally planar panels, a first two of the panels occupying the ends of the rectangular sheet, and the other two panels being located between the first two panels to give a cross-section of a diamond-shaped conformation for embracing the wrist of a patient with opposite corners embracing the wrist exteriorly of the radius and ulna bones to press them together, and

(b) a bandage surrounding the clamp to regulate the pressure of the clamp on the wrist.

4,966,138

PUNCTURE PROTECTOR

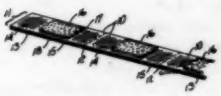
Peter P. Chow; Josephine N. Lo, and Loren A. Chow, all of 2317 Byrnes Rd., Minnetonka, Minn. 55343

Filed Mar. 29, 1989, Ser. No. 330,419
Int. Cl.[5] A61L *15/00*
U.S. Cl. 128—155 **8 Claims**

1. A conformable body protector for protecting selected portions of a user's body, such as fingers, against needle punctures thereof when that user is manipulating needles both

individually and as mounted on syringes, said body protector comprising:

a flexible backing material portion capable of substantial flexure to be able to conform to a selected portion of said user's body, and having first and second sides thereof opposite one another with a releasable adhesive provided on said first side thereof; and



a shield member portion capable of blocking passage therethrough of syringe needles forced thereagainst, said shield member portion also being capable of substantial flexure to permit substantial conformance thereof to that portion of said user's body against which said flexible backing material portion is to be conformed, said shield member portion being adherent to all of a substantial portion of said flexible backing material portion which is covered by said shield member at a selected location therein.

4,966,139

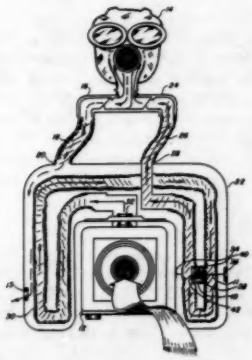
OXYGEN BREATHING BAG SIMULATOR

Edmund Swiatosz, Maitland, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 23, 1989, Ser. No. 374,110

Int. Cl.[5] A62B *7/00*

U.S. Cl. 128—205.23 **6 Claims**



1. A simulator for training a trainee in the use of a self-contained operational breathing bag device that has an inflatable bag from which a supply of breathable gas is available to the user, wherein the simulator comprises an inflatable bag apparatus having first and second inlets, and first and second outlets; a continuous tubular conduit inside the bag apparatus that forms an uninterrupted path communicating breathable air from said first inlet to said first outlet; means detachably fixed to said first inlet for providing the only source of air to said conduit; a face piece having an inhalation port connected to said first outlet for coupling the air communicated by said conduit to the trainee; and, a valve within said continuous conduit capable of regulating the flow of air through the conduit; attachment means connecting said valve to said inflatable bag for opening the valve to permit the flow of air in response to inflation of the bag, and for closing the valve to prevent the flow in response to deflation of the bag, such that the temporary deprivation of gas to the user that is caused in the operational device by deflation of its bag, is simulated by the simulator; wherein said face piece includes an exhalation port connected to said second inlet of the bag apparatus such that the trainee's exhalation provides the air to inflate the apparatus, and said second outlet of the apparatus is a relief valve to vent excess pressure from the bag apparatus.

4,966,140

PROTECTIVE FACIAL MASK

Wolfgang Herzberg, Wedel/Holstein, Fed. Rep. of Germany, assignor to Renate Dunsch-Herzberg, Wedel/Holstein, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,299

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 8809551[U]

Int. Cl.[5] A62B *7/00*

U.S. Cl. 128—206.19 **2 Claims**

1. A facial mask for the protection of the operating surgeon, the medical staff et al. against the effects of secretions and blood of patients suffering from immune deficiency disease AIDS, comprising a mask with upper and lower marginal portions and laterally spaced side edge portions, substantially vertical fastening tapes along each side edge portion and a sealing strip formed along the upper marginal portion of the mask blank, the sealing strip extending continuously and substantially across the full extent of the upper marginal portion of the mask, and the strip comprising a highly flexible and compressible intermediate portion between an adhesive surface and the facial side of the mask and consisting of an elongated plastic member folded along longitudinal lines, the adhesive surface being coated with a pressure sensitive adhesive agent, and a peelable protective sheet over said pressure sensitive adhesive agent.

4,966,141

ENDOTRACHEAL TUBE AND MASS SPECTROMETER

Marvin B. Bacaner, 4401 Fremont Ave. S., Minneapolis, Minn. 55409, and John H. Broadhurst, 1560 Sumter Ave. N., Golden Valley, Minn. 55427

Continuation-in-part of Ser. No. 205,668, Jun. 13, 1988, Pat. No. 4,850,371. This application Jun. 12, 1989, Ser. No. 364,109

Int. Cl.[5] A61M *16/00*

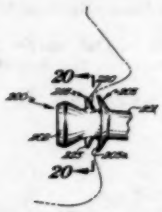
U.S. Cl. 128—207.14 **10 Claims**

1. A disposable tissue gas sampling mouthpiece device for use in obtaining tissue and respiratory gases for analysis from a human subject, comprising:

an elongate flexible tube for insertion into the mouth of a human subject, including a cylindrical tubular wall defining a central passage therethrough and having upper and lower ends, said lower end positioned with the oral cavity of a human subject and said upper end extending exteriorly of a human subject adapted to be connected to a miniature motor pump and mass spectrometer module, the motor pump and mass spectrometer module being connected to a vacuum source,

an elongate axially extending tissue gas sample passage and an elongate axially extending tissue gas return passage in the wall of said tube, each passage having an upper and lower end, the upper end of each passage adapted to be connected in communicating relation with the motor pump and mass spectrometer module, the lower end of said tissue gas return passage communicating with said central passage, and

a hollow tissue sampling member secured to said tube and extending outwardly therefrom and adapted to be positioned between the teeth and lips of a human subject, said tissue sampling member having one surface thereof disposed in conforming relation to mouth and lip tissue of a human subject, the lower end of said tissue sampling



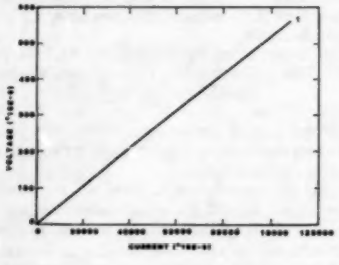
passage communicating with the interior of said hollow tissue sampling member, said one surface of the tissue sampling member having openings therein communicating with the interior thereof, whereby, when said tissue gas sample passage is subjected to a vacuum by the vacuum source connected to the miniature motor pump and mass spectrometer module, the lip and mouth tissues of a human subject will be drawn into intimate contact with said one surface of said gas sampling member to cause outgassing of tissue gases from the mouth and lip tissues through the openings in said gas sampling member through the tissue gas sample passage and into a pump motor and mass spectrometer module for analysis of the tissue gases.

4,966,142

METHOD FOR ELECTRICALLY JOINING SUPERCONDUCTORS TO THEMSELVES, TO NORMAL CONDUCTORS, AND TO SEMI-CONDUCTORS

George O. Zimmerman, South Hamilton, and Alvaro Kaplan, Brookline, both of Mass., assignors to Trustees of Boston University, Boston, Mass.

Filed Jun. 30, 1989, Ser. No. 374,411
Int. Cl.[5] B23K *1/02*
U.S. Cl. 228—263.12 **6 Claims**



1. A method for electrically joining superconductive materials to themselves, to conductive materials, or to semi-conductive materials, said method comprising the steps of:

obtaining a bonding alloy comprising from about 50 to 90 atomic percent indium, and an additive comprised of from about 0 to about 40 atomic percent mercury, from 0 to about 40 atomic percent gallium, and from 0 to about 55 atomic percent bismuth;

preparing a surface of each material to be joined as a clean surface;

heating said alloy such that at least a non-oxidized, semi-liquid state is formed;

introducing said heated alloy to each non-oxidized surface such that each of said surfaces becomes substantially wetted by said heated alloy;

applying additional heated alloy to each of said wetted surfaces concurrently to form a continuous alloy juncture between said materials; and

allowing said alloy juncture to solidify such that a joined electrical interface resistance of not more than 10^{-3} ohms per square centimeter is provided by said solidified alloy at temperatures not greater than about 20° C.

4,966,143

SURGICAL WIRE GUIDE

Charles I. Meinershagen, P.O. Box 705, Redding, Calif. 96099

Filed Dec. 6, 1988, Ser. No. 280,461
Int. Cl.[5] A61B *17/06*
U.S. Cl. 606—103 **12 Claims**

1. A guide for surgical wire comprising an elongate body having a longitudinally extending groove open at one end of the body and terminating at the tip end of the body, said groove having a depth sufficient to accommodate a surgical wire, and means comprising a solid portion of said body with an undercut formed adjacent said tip end for retaining the distal end of the surgical wire within the adjacent portion of said groove.

4,966,144

METHOD FOR INDUCING REGENERATION OF INJURED NERVE FIBERS

Simeone Rochkind, 5 Kashani St.; Liliane Barr-Nea, 5 Debora Hanevia St., and Rachel Lubart, 10 Hankin St., all of Tel Aviv, Israel

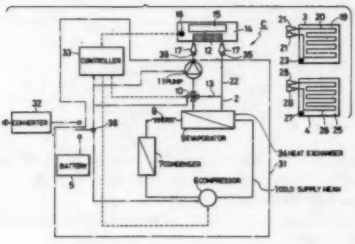
Filed Jun. 8, 1988, Ser. No. 204,207
Claims priority, application Israel, Jun. 9, 1987, 82830
Int. Cl.[5] A61N *5/00*
U.S. Cl. 128—395 **15 Claims**

1. A method of inducing functional regeneration of nerve fibres at an injured site of the spinal cord, comprising exposing said injured site, grafting into said injured site graft selected from the group consisting of peripheral nerves and spinal cord segments, in such a way that the graft's longitudinal axis is parallel to the spinal cord's longitudinal axis and that said graft is in contact with both the proximal and distal uninjured spinal cord tissue, suturing the dura, muscle, fascia and skin, and post operatively irradiating the so grafter area of the spinal cord with a light source generating light at a wavelength being within the range of 380–1200 nm.

4,966,145
AUTOMATIC BODY TEMPERATURE ADJUSTER

Makoto Kikumoto; Masakazu Moroto, both of Hirakata, and Masato Osumi, Moriguchi, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Continuation of Ser. No. 168,415, Mar. 15, 1988, abandoned.
This application Sep. 1, 1989, Ser. No. 403,034
Claims priority, application Japan, Mar. 19, 1987, 62-62482
Int. Cl.[5] A61F 7/00
U.S. Cl. 128—377 7 Claims



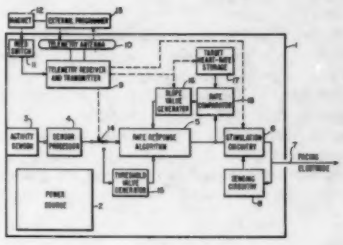
1. An automatic body temperature adjuster for use with a wheelchair, comprising:
- a seat having a coolant medium circulation path, said seat having a sensor;
- a back support having a coolant medium circulation path, said back support having a sensor;
- a collar having a coolant medium circulation path, said collar having a sensor;
- a cold supply means;
- a heat exchange means connected to said cold supply means;
- means for making said coolant medium circulation path of said seat connectable with said heat exchange means;
- means for making said coolant medium circulation path of said back support connectable with said heat exchange means;
- first control means connectable to said seat's sensor for ascertaining the temperature of said seat and regulating said cold supply and heat exchange means;
- second control means connectable to said back support's sensor for ascertaining the temperature of said back support and for regulating said cold supply and heat exchange means; and
- third control means connectable to said collar's sensor for ascertaining a person's temperature and for regulating said cold supply and heat exchange means.

4,966,146
RATE-RESPONSIVE PACEMAKER

Stuart C. Webb, 5 Lingholm Way, Barnet; Leland M. Lewis, 43 Prince George Avenue, Oakwood, London, and Jayne A. Morris-Thurgood, 20 Pym Walk, Thame, Oxfordshire, all of United Kingdom

Filed Jan. 11, 1989, Ser. No. 295,936
Claims priority, application United Kingdom, Jan. 14, 1988, 8800810
Int. Cl.[3] A61N 1/36
U.S. Cl. 128—419 PG 15 Claims

1. A pacemaker comprising:
- means for producing a first signal indicative of a sensed level of activity of a user,
- means responsive to said first signal for producing a second signal as a predetermined function of the first signal to control pacing rate, and
- selectively operable means for, when the pacemaker is put in a programming mode, adjusting said function, and comprising:
- means for storing a given signal indicative of a particular value of said second signal corresponding to a predetermined level of exercise performed by said user, and

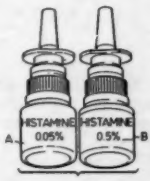


means for varying said function until said second signal is equal to said given signal in response to the first signal produced while the user is performing said predetermined level of exercise.

4,966,147
METHOD FOR THE DIAGNOSIS OF ALLERGIC RHINITIS

Eitan Yaniv, 28 Rambam Street, Ra'anana, Israel

Filed Apr. 24, 1989, Ser. No. 341,873
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—630 10 Claims



1. A method for the diagnosis of allergic rhinitis in a patient, comprising:
- examining the size of the patient's nasal airway;
- administering histamine to the patient's nasal airway; and
- after a predetermined time interval, reexamining the size of the patient's nasal airway to determine whether or not it has become substantially blocked, the blocking of the nasal airway indicating the patient is suffering from allergic rhinitis.

4,966,148
ASSEMBLY FOR POSITIONING DIAGNOSTIC DEVICES IN A BIOLOGICAL VESSEL

Huntly D. Millar, Houston, Tex., assignor to Millar Instruments, Inc., Houston, Tex.

Continuation of Ser. No. 119,616, Nov. 12, 1987, Pat. No. 4,850,358, which is a continuation-in-part of Ser. No. 931,273, Nov. 14, 1986, Pat. No. 4,771,782. This application Dec. 19, 1988, Ser. No. 286,475
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—637 15 Claims

1. An assembly for positioning a plurality of devices in a region of a biological fluid-carrying vessel, the assembly comprising:

an elongated, flexible guidewire adapted for insertion in the

vessel and having a distal end positionable proximate the region;

a first device adapted for engaging the guidewire and positionable in the region, the device including

an elongated body,

elongated coupling structure depending from the body for at least a portion thereof and having a longitudinally oriented passage for slidably receiving the guidewire and adapted for positioning the first device on the guidewire in the region of the vessel,

an elongated catheter coupled to the body in longitudinal alignment therewith;

a second device adapted for engaging the guidewire and positionable in the region, the device including

an elongated body,

elongated coupling structure depending from the body for at least a portion thereof and having a longitudinally oriented passage for slidably receiving the guidewire and adapted for positioning the second device on the guidewire in the region of the vessel,

an elongated catheter coupled to the body in longitudinal alignment therewith;

the coupling structures being adapted for concurrently positioning both devices on the guidewire in the region of the vessel,

at least one of the devices comprising a diagnostic sensor adapted for measuring in vivo a fluid characteristic.

4,966,149

REDUCING THE EFFECTS OF COHERENCE IN MAGNETIC RESONANCE IMAGING

Saul Stokar, Rannana, Israel, assignor to Elscint Ltd., Haifa, Israel

Continuation of Ser. No. 159,125, Feb. 23, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 463,780

Int. Cl.[5] A61B *5/055*

U.S. Cl. 128—653 A **7 Claims**

1. A magnetic resonance imaging system in which the effect in a displayed image of modulation produced by quasi-periodic motion of a subject being imaged is reduced (MRI), said system comprising:

MRI data acquiring means for acquiring a plurality of multi-dimensional signals from a portion of the subject,

means for digitizing said multi-dimensional signals, means for reducing the effect of modulation produced by quasi-periodic motion of the subject,

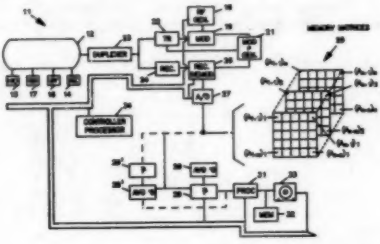
said reducing means comprising:

means for storing said digitized signals in areas of a plurality of multi-dimensional matrices as pixel data,

each of said areas being defined by specific rows and specific columns of each of said multi-dimensional matrices,

said areas corresponding to pixels in a displayed image,

controller means for averaging pixel data from the same



specific rows and specific columns in each of said plurality of matrices after the data for all of the matrices has been acquired, and

means for reconstructing an image using the averaged pixel data.

4,966,150

ECHO TRACKING SYSTEM FOR APPARATUS FOR ULTRASONIC MEASUREMENT OF THE POSITION OF A MOBILE WALL

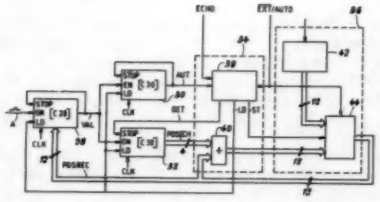
Jean-Daniel Etienne; Pierre-André Farine, both of Neuchâtel, and Claude Bornoz, Fleurier, all of Switzerland, assignors to Asulab S.A., Bienne, Switzerland

Filed Apr. 11, 1989, Ser. No. 336,392

Claims priority, application France, Apr. 14, 1988, 88 05065

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—661.04 **12 Claims**



1. Echo tracking system for an apparatus for ultrasonic measurement of the position of a mobile wall, comprising an input to receive a digital echo signal produced by reflection from a mobile wall of an interrogating ultrasonic pulse the transmission of which is controlled by a control pulse (A) transmitted at a given repetition rate (F_r), said echo tracking system comprising:

clock means for delivering a clock signal (CLK);

enabling means for delivering, on reception of a validation signal (VAL), an enabling signal (AUT) which defines a time-window during which the echo signal is expected; and

logic circuit means for receiving said digital echo signal and for delivering, at said repetition rate, a recenter position value (POSREC) which is a function of a received echo position value (POSECH) and which represents the time-position of the digital echo signal in said window; said echo tracking system further comprising:

depth counter means for counting at the frequency of said clock signal (CLK) between said recentered position value (POSREC) and a first given value, wherein the

beginning of the counting is triggered by said control pulse (A), and said depth counter means emits said validation signal when it reaches said first given value; and

position detector means for determining the position of the echo in said time-window, said position detector means counting at the frequency of the clock signal (CLK) from a second given value, wherein the beginning of counting is triggered by said validation signal, and said position detector means delivers said echo position value (POSECH) to said logic circuit means.

4,966,151

ULTRASONIC DIAGNOSTIC APPARATUS

Yasuhito Takeuchi, Tokyo, Japan, assignor to Yokogawa Medical Systems Limited, Tokyo, Japan

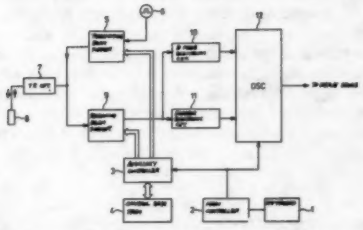
PCT No. PCT/JP87/00713, § 371 Date Mar. 27, 1989, § 102(e) Date Mar. 27, 1989, PCT Pub. No. WO88/02240, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 30, 1987, Ser. No. 335,664

Claims priority, application Japan, Sep. 30, 1986, 61-232647

Int. Cl.[5] A61B *8/12*

U.S. Cl. 128—660.05 **3 Claims**



1. An ultrasonic diagnostic apparatus

for transmitting and receiving a plurality of ultrasonic beams in both a B-mode and a Doppler mode, comprising

a vibrator array means for transmitting and receiving the ultrasonic beams of selected beam width in azimuth direction and of selected beam depth in depth direction and having an opening divided into N parts;

means for producing beam forming data for adjacent ultrasonic beams, said data being divided into N parts for each adjacent ultrasonic beam; and

means for carrying out focusing in the Doppler mode by applying selected parts of the beam forming data of adjacent ultrasonic beams to respective parts of the vibrator array opening so that the beam width in the aximuth direction is increased.

4,966,152

TRANSDUCER

Achim Gäng, Stuttgart; Martin Schraag, Sindelfingen, both of Fed. Rep. of Germany, and Günter Biendinger, Summerville, S.C., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 20, 1988, Ser. No. 221,807

Claims priority, application European Pat. Off., Jul. 21, 1987, 87110529.2

Int. Cl.[5] A61B *8/02*

U.S. Cl. 128—661.07 **7 Claims**

1. A transducer for extra-uterine monitoring of fetal heart rate and uterus activity during pregnancy and labor comprising:

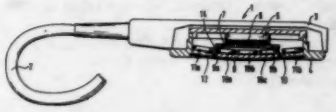
a casing having a cover an sides extending from one side of said cover,

strain detection means mounted on said one side of said cover for providing signals in response to movement of an input member therof,

a base plate,

means between said cover and said base plate for mechanically coupling said base plate to said input member so that movement of said base plate moves said input member,

a piezo-electric crystal centrally mounted on said base plate,



a plurality of piezo-electric crystals mounted on said base plate around said piezo-electric crystal,

means forming a ring extending inwardly from said sides, and forming a space between it and said base plate, and

another plurality of piezo-electric crystals mounted around said ring.

4,966,153

ULTRASONIC DOPPLER BLOOD FLOW VELOCITY DETECTION APPARATUS AND A METHOD FOR DETECTING BLOOD FLOW VELOCITY

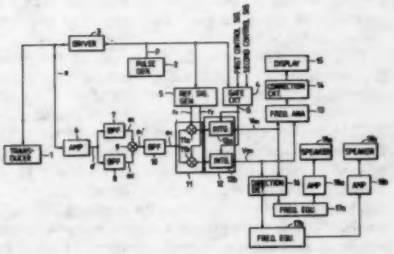
Yasuhiro Nakamura, Tokyo; Ikuo Sakai, Kawasaki, and Masami Kawabuchi, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 21, 1989, Ser. No. 341,506

Claims priority, application Japan, Apr. 22, 1988, 63-100739

Int. Cl.[5] A61B *8/06*

U.S. Cl. 128—661.09 **9 Claims**



1. An ultrasonic Doppler blood flow velocity detection apparatus comprising:

(a) transducing means for transmitting ultrasonic waves in response to each pulse of a pulse train and for receiving reflected ultrasonic waves from an ultrasonic-wave reflective object in the blood of a human body and converting the received ultrasonic waves into an electric echo signal;

(b) first signal extraction means for extracting a signal component of a first frequency f1 from said echo signal by directly filtering said echo signal;

(c) second signal extraction means for extracting a signal component of a second frequency f2 different from said first frequency f1 from said echo signal by directly filtering said echo signal;

(d) frequency difference signal producing means for producing a signal having a frequency of $|f1-f2|$ using said signal components of said first and second signal extracting means;

(e) detection means for detecting amplitude of an output signal of said frequency difference signal producing means and for phase-comparing said output signal with a reference signal; and

(f) reference signal generation means for generating said reference signal of a predetermined frequency fr in response to each of said pulses, said predetermined fre-

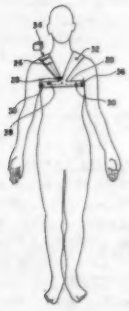
quency fr being approximately equal to the frequency difference $|f1-f2|$.

4,966,154

MULTIPLE PARAMETER MONITORING SYSTEM FOR HOSPITAL PATIENTS

Jonni Cooper, P.O. Box 5333, Indian Rocks Beach, Fla. 33535, and Tello Adams, Seminole, Fla., assignors to Jonni Cooper, Indian Rocks Beach, Fla.

Filed Feb. 4, 1988, Ser. No. 152,272
Int. Cl.[5] A61B *5/0205*
U.S. Cl. 128—671 **19 Claims**



1. Apparatus adapted for use in a multiple parameter monitoring system for ambulatory human patients, said apparatus comprising:

a separate harness to be removably worn by each patient, said harness being adapted to engage the chest of the patient and incorporating

first ECG data sensing means for engaging the patient to produce first and second analog voltages having variable magnitudes which are measurements of the body MCL 1 and MCL 6 data respectively, said first means including MCL 1 and MCL 6 electrodes and a ground electrode, the first analog voltage appearing between the MCL 1 and ground electrodes, the second analog voltage appearing between the MCL 6 and ground electrodes;

second respiratory sensing means for engaging the patient to produce a first analog signal having a variable magnitude which is a measurement of the respiratory amplitude of the patient, said second means including two additional spaced electrodes for engaging the patient and exhibiting a respiratory impedance therebetween; and

third temperature sensing means for engaging the patient to produce a second analog signal which is a measurement of the temperature of the patient, said third means including a temperature responsive impedance element.

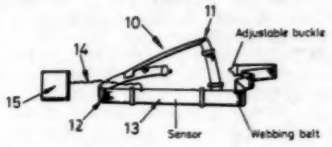
4,966,155

APPARATUS FOR MONITORING PHYSIOLOGICAL PARAMETERS

John Jackson, Lesmahagow, Scotland, assignor to The University of Strathclyde, Glasgow, Scotland

Continuation of Ser. No. 317,130, Mar. 1, 1989, abandoned, which is a continuation of Ser. No. 183,285, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 927,640, Sep. 29, 1986, abandoned. This application Nov. 17, 1989, Ser. No. 437,323
Claims priority, application United Kingdom, Jan. 31, 1985, 8502443
Int. Cl.[5] A61B *5/0205*
U.S. Cl. 128—671 **5 Claims**

1. Apparatus for monitoring physiological parameters in human beings, said apparatus comprising a harness adapted to be worn on the upper body of a human being and incorporating a single circumferential band for extending around the truck portion between the thorax and the abdomen of said upper body, said band comprising a substantially inelastic portion circumferentially conjoined with an elastic portion, said elastic portion incorporating an electroconductive elastomeric means having an electrical resistance value which changes as a function of elongation of said elastic portion, and analyzing means electrically connected to said elastomeric means for analyzing changes in said resistance value arising from changes in volume of said trunk portion and establishing



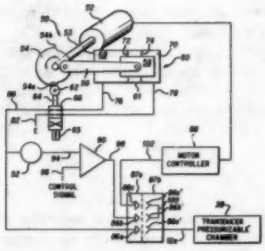
physiological parameters therefrom in accordance with predetermined algorithms, wherein said analyzing means comprises data entry means for entering personal characteristics of the human being whose physiological parameters are being monitored, such characteristics including sex gender and quantitative data of height and weight, and the analyzing means further comprises first signal conditioning means for conditioning the electrical signal waveform received form the elastomeric means to establish a breathing waveform, said first signal conditioning means comprising means for analogue smoothing of the signal by elimination of its high frequency content.

4,966,156

PRESSURIZATION SYSTEM FOR CONTINUOUS BLOOD PRESSURE MONITOR TRANSDUCER

William D. Perry, and Dean C. Winter, both of San Antonio, Tex., assignors to Colin Electronics Co., Ltd., Aichi, Japan

Filed Feb. 25, 1988, Ser. No. 160,689
Int. Cl.[5] A61B *5/02*
U.S. Cl. 128—672 **8 Claims**



1. A pressurization system for a continuous blood pressure monitor transducer, comprising:

a transducer having a pressurizable chamber;

compression means for compressing a fluid having first and second compression chambers, said first and second chambers being alternately in fluid communication with said pressurizable chamber within said transducer;

switch means operatively connected to said first and second chambers and said pressurizable chamber for controlling fluid flow between said first and second chambers and said pressurizable chamber; and

means operatively connected to said compression means and said switch means for driving said compression means and

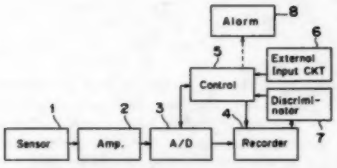
simultaneously operating said switch means to provide pressurized fluid into said pressurizable chamber.

4,966,157

ELECTROCARDIOGRAPH OPERABLE TO FORM UPDATED SEQUENTIAL SERIES OF CARDIOGRAPHIC SIGNALS

Takashi Suzuki, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 16, 1989, Ser. No. 324,082
Claims priority, application Japan, Mar. 17, 1988, 63-65246
Int. Cl.[5] A61B *5/04*
U.S. Cl. 128—696 **17 Claims**



1. An electrocardiograph comprising:

detecting means for detecting cardiographic signals from a living body;

storage means for storing a sequential series of said detected cardiographic signals;

storage control means for performing a storage control operation to suquentially store a newly detected cardiographic signal as a most recent detected cardiographic signal in said sequential series of said detected cardiographic signals and to delete the least recent detected cardiographic signal of said sequential series of said detected cardiographic signals to form an updated sequential series of said detected cardiographic signals; and

cardiographic data hold commanding means operable in response to a data hold commanding signal to command the retaining of an updated sequential series of said detected cardiographic signals in said storage means.

4,966,158

MEASUREMENT METHOD FOR MOISTURE CONTENT IN THE SKIN AND SYSTEM THEREFOR

Yasuhiro Hosma, Ichikawa; Nobuo Miyazaki, Yokohama; Hisashi Misumi, Utsunomiya; Toshiyasu Suda, Chiba; Shuichi Akazaki, Funabashi; Yoshihiro Minematsu, Funabashi, and Michio Kawai, Funabashi, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 271,015
Claims priority, application Japan, Nov. 12, 1987, 62-285780
Int. Cl.[5] A61B *5/05*
U.S. Cl. 128—734 **6 Claims**

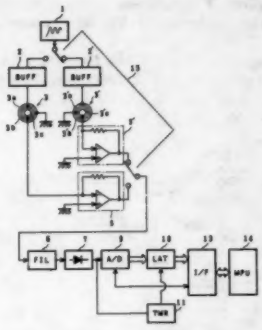
1. A system for measuring moisture content in skin comprising:

at least one measurement electrode structure of triple concentric electrodes including a central electrode, an intermediate electrode and an outer electrode, all of which can be abutted on the surface of said skin,

generator means for supplying low frequency current between two of said electrodes,

an amplifier connected to receive a voltage appearing between two of said electrodes, at least one of which is different than said two electrodes to which said generator means is connected,

switch means for switching a connection between said amplifier and said electrodes and between said generator means and said electrodes such that different ones of said electrodes receive said low frequency current and differ-



ent ones of said electrodes are connected to said amplifier, and

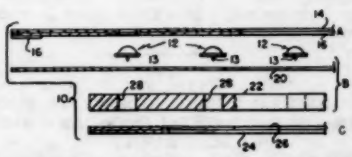
means for displaying an output voltage of the amplifier.

4,966,159

ALLERGY TEST STRIP

Nicholas H. Magunias, Reston Medical Bldg., 1712 Club House Rd., Reston, Va. 22090

Continuation-in-part of Ser. No. 445,746, Nov. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 330,587, Dec. 14, 1981, Pat. No. 4,473,083. This application Aug. 27, 1984, Ser. No. 644,941
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—743 **14 Claims**



1. A laminated test strip for allergy testing by a technique involving penetration of an allergen into the skin comprising: at least one lance device having at least one lance projecting therefrom; a support lamina having opposite surfaces and an aperture extending through the lamina from one of said surfaces to the other, said lance device being positioned on one of said surfaces with said lance extending into said aperture in said support lamina; a first removable lamina releasably sealed to the surface of said support lamina opposite the surface on which said lance device is positioned and overlying said aperture to prevent entry of foreign material into said aperture but upon being removed from said opposite surface of said support lamina permitting an allergen to be applied to said lance; a second removable lamina releasably sealed to said one surface of said support lamina, said lance device being attached to said second removable lamina so that upon removal of said second removable lamina said lance device is also removed and can be applied to the skin.

4,966,160

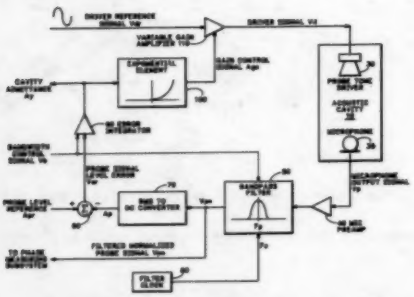
ACOUSTIC ADMITTANCE MEASURING APPARATUS WITH WIDE DYNAMIC RANGE AND LOGARITHMIC OUTPUT

Jonathan D. Birck, Portland, and Valdis E. Garuts, Beaverton, both of Oreg., assignors to Virtual Corporation, Portland, Oreg.

Continuation of Ser. No. 788,746, Oct. 18, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,462

Int. Cl.[5] A61B *5/12*

U.S. Cl. 128—746 **5 Claims**



1. An electrical circuit apparatus for measuring the acoustic admittance of the ear cavity in response to probe tone frequency signals applied for tympanometry and acoustic reflex testing, said apparatus comprising:

(a) probe tone driver means for applying a probe tone to an ear cavity;

(b) microphone means for providing an output signal responsive to the admittance of said cavity;

(c) bandpass filter means coupled to receive said microphone output signal and having a band pass centered about the frequency of said probe tone;

(d) converter means coupled to the output of said filter means for providing as an output a filtered DC representation of said microphone output signal;

(e) summer means for algebraically combining the DC output of said converter means with a reference signal representing said probe tone to provide an error signal; and

(f) exponential circuit element means responsive to said error signal for deriving a logarithmic signal to control said probe tone driver means.

4,966,161

APPARATUS FOR CONTINUOUSLY MEASURING INTRACOMPARTMENTAL PRESSURE WITHIN A BODY CAVITY

William D. Wallace, Salt Lake City, and Christopher A. Cutler, Centerville, both of Utah, assignors to Utah Medical Products, Midvale, Utah

Filed Mar. 31, 1989, Ser. No. 331,436

Int. Cl.[5] A61B *5/03*

U.S. Cl. 128—748 **35 Claims**

1. An apparatus for continuously measuring intracompartmental fluid pressures exerted by a liquid contained within a body cavity, comprising:

pressure-sensing means for insertion into said body cavity so as to detect said intracompartmental fluid pressures therein, said pressure-sensing means comprising first chamber means for defining a first volume which is in fluid communication with said liquid such that said liquid will enter said first chamber means and form a liquid column therein having a liquid-air interface, and further comprising second chamber means for defining a second volume which is air-filled and is in fluid communication with said first chamber means;

pressure transducer means attached to said pressure sensing means for generating an electrical signal proportional to fluid pressure communicated by said pressure-sensing means to said pressure transducer means; and

wherein a ratio is defined by said first and second volumes such that the ratio of said first volume to said second volume is such that, at maximum fluid pressures exerted within said body cavity, said liquid column in said first chamber means will tend to be minimized so as to minimize hydrostatic pressure error resulting therefrom and such that said liquid-air interface will be prevented from entering said second chamber means.

4,966,162

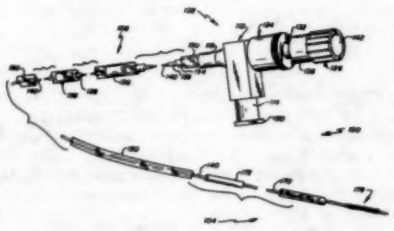
FLEXIBLE ENCOSCOPE ASSEMBLY

Ko P. Wang, 11006 Nacirema La., Stevenson, Md. 21153

Filed Jan. 25, 1989, Ser. No. 301,132

Int. Cl.[5] A61B *10/00*

U.S. Cl. 128—750 **7 Claims**



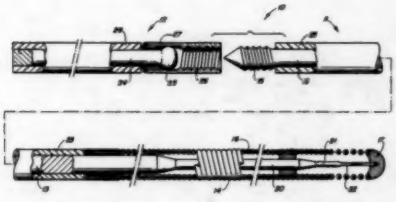
1. A tissue collection system for use with endoscopes to collect tissue specimens from a site in the body, said system including an elongated outer flexible hollow catheter having distal and proximal ends, an elongated member slidably positioned within said hollow catheter, control means for controlling the sliding movement of said elongated member within said hollow catheter and for permitting the application of fluids or suction at the tissue collection site, said elongated member having a proximal end connected to said control means and a distal end terminating with a sharpened point, and brush means integrally formed with said elongated member adjacent said distal end for collecting tissue specimens, said brush means beginning at a point spaced a first predetermined distance along said elongated member from said sharpened point and extending along said elongated member for a second predetermined distance.

4,966,163

EXTENDABLE GUIDEWIRE FOR VASCULAR PROCEDURES

Jeffrey L. Kraus, San Jose, and Linda T. Guthrie, Fremont, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Filed Feb. 14, 1989, Ser. No. 311,005
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—772 4 Claims



1. An extendable intravascular guidewire system which facilitates the insertion and withdrawal of an intravascular catheter from a patient, comprising:

(a) a main elongated guidewire section adapted to be inserted into a patient's vascular system which has a mating end adapted to extend out of the patient;

(b) an elongated guidewire extension section having a

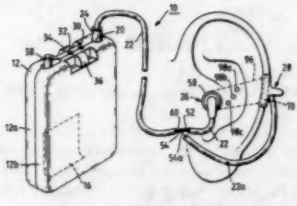
(c) a manually operable, releasable connection between the mating ends of the main guidewire section and the extension section to hold the sections in axial alignment including an open-ended, internally threaded female member on a mating end of one of the guidewire sections and a threaded female connecting member on the mating end of the other guidewire section which is adapted to be inserted into and threadably engaged with the male connecting member to releasably secure the two sections together, at least one of said connecting members being fixed to a mating end of a section and free to rotate with respect thereto.

4,966,164

COMBINED SOUND GENERATING DEVICE AND ELECTRICAL ACUPUNCTURE DEVICE AND METHOD FOR USING THE SAME

Ronnie Colsen; Alexander Kairis, and Andrew L. Deller, all of Tokyo, Japan, assignors to Tradatlantex AG, Glaris, Switzerland

Filed Dec. 13, 1988, Ser. No. 283,593
Claims priority, application Japan, Dec. 29, 1987, 62-333169
Int. Cl.[5] A61N 1/00
U.S. Cl. 128—789 27 Claims



1. A combined sound-generating device and electrical acupuncture device, said sound-generating device comprising an earphone and a sound generating circuit, said earphone having a buzzer operable to make sounds of low-frequency and said sound-generating circuit being adapted to deliver low voltage signals of low-frequency to operate said buzzer, said earphone additionally having a first electrode adapted to contact the surface of said auricle and forming part of said electrical acupuncture device, said electrical acupuncture device also including a clip adapted to be attached to the rim of said auricle, said clip having a second electrode adapted to contact said rim, and an acupuncture point stimulating circuit adapted to deliver a high voltage stimulus of low current to said electrodes, said first and second electrodes being oppositely charged.

4,966,165

UNISEX CONDOM

Ray C. Anderson, 7605 S. Quebec, Tulsa, Okla. 74136

Continuation-in-part of Ser. No. 47,121, May 8, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 212,244
Int. Cl.[5] A61F 5/42
U.S. Cl. 128—830 5 Claims

1. A unisex condom to be worn by human males or females, comprising:

(a) pant-like body means adapted to be received about the pelvic region of a human male or female user and forming front, rear and side portions and a crotch portion, said body means defining a waist opening at the upper portion thereof and a pair of leg openings at the lower portion thereof; and

(b) a pair of impervious flexible tubular projections formed integrally with and extending from the front and rear of said crotch portion of said body means and being disposed in angular relation with one another, said tubular projections each defining a closed extremity and each forming a respective opening at the juncture thereof with said body means, and are capable of being reversed inside-out to thereby position at least one of said projections inwardly of said body means.

4,966,166

PROPHYLACTIC DEVICE AND METHOD

John T. Leffler, 8043 Tierneys Woods Curve, Bloomington, Minn. 55438

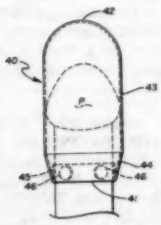
Continuation-in-part of Ser. No. 100,923, Sep. 28, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,397
Int. Cl.[5] A61F 6/04
U.S. Cl. 128—844 2 Claims

1. A tubular prophylactic device formed of flexible, thin impermeable sheet material, having an open end, a closed end and an extended length from the open end to the closed end, characterized by:

a. a midsection extending between the open end and the closed end having a circumference sufficiently large to permit movement of an erect male penis within said midsection during coitus,

b. a sleeve section formed at the open end having a circumference sufficiently small to fit snugly about the shaft of an erect mature human penis, folded inwardly with respect to the midsection, thereby being disposed inside the device for fixed engagement with the shaft of the penis, and

c. a plurality of circumferentially spaced, thin rigid members adhered to the sleeve section on the outer surface thereof



between the sleeve section and the midsection to prevent peeling of the sleeve section from the shaft of the penis.

4,966,167

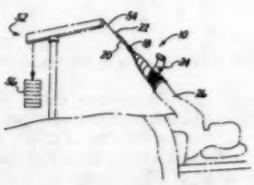
SURGICAL DRAPE FOR APPLYING TRACTION

Randall W. Jacobs, Santa Ana, and Robert H. Peterson, Rancho Santa Margarita, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Filed Jan. 13, 1989, Ser. No. 296,970

Int. Cl.[5] A61B *19/00*

U.S. Cl. 128—849 **35 Claims**



1. An apparatus useful for applying a traction force from a traction force system to a limb of a patient comprising:

an elongated tubular seamless member having an open first end and an opposing second end, sized and adapted to receive a substantial portion of a limb of a patient through said open first open, and being constructed so that the traction force from the traction force system is applied substantially uniformly over and substantially around at least a portion of the received limb;

an elongated seamless hollow element having an open end and a sidewall which is microbially impermeable, sized and adapted to receive the received limb through said open end; and

attachment means secured to said elongated tubular member and acting to connect said elongated tubular member to the traction force system.

4,966,168

OPHTHALMIC DRAPE WITH BUILT-IN MINI-MASK

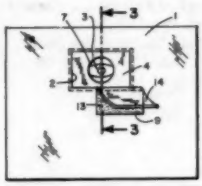
Jacob A. Glassman, 1680 Michigan Ave., Miami Beach, Fla. 33139

Continuation-in-part of Ser. No. 295,644, Jan. 3, 1989, abandoned. This application Jul. 31, 1989, Ser. No. 387,419

Int. Cl.[5] A61B *19/08*

U.S. Cl. 128—853 **11 Claims**

1. A surgical drape adapted to cover a patient's face while undergoing eye surgery, ventilation means in said drape to facilitate easy breathing by the patient, said surgical drape including a first opening adapted to only expose the patient's eye, said ventilation means comprising a second opening in said drape and a separate sheet of surgical filter mask material larger than said second opening and attached thereto and



covering said second opening and adapted to overlie the area of the patient's nostrils and mouth.

4,966,169

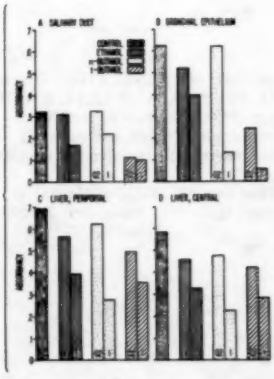
PROCESS FOR MANUFACTURING CIGARETTES

William J. Waddell; Carolyn Marlowe, both of Prospect, and L. Douglas Keeney, Louisville, all of Ky., assignors to C. A. Blockers, Inc., Petersburg, Va.

Continuation-in-part of Ser. No. 921,823, Oct. 21, 1986, abandoned, which is a continuation of Ser. No. 834,129, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 506,824, Jun. 23, 1983, abandoned, and a continuation-in-part of Ser. No. 84,798, Aug. 13, 1987. This application Jan. 28, 1988, Ser. No. 149,482

Int. Cl.[5] A24B *15/30*

U.S. Cl. 131—31 **72 Claims**



1. A process for manufacturing cigarettes comprising the steps of:

producing an ink comprising a slurry medium of microcapsules of an alcohol having two or more carbon atoms, said alcohol being capable when released from the microcapsules and having the vapor thereof inhaled by the smoker of inhibiting the selective localization of at least one nitrosamine or a metabolite thereof in the tissues of the smoker, said alcohol being present in an amount sufficient to inhibit the selective localization but not to produce any toxic effects in the smoker, and

printing the ink on cigarette paper.

4,966,170

TOBACCO PROCESSING

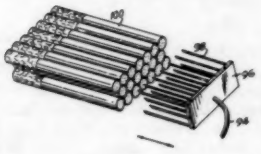
Gus D. Keritsis; Jose G. Nepomuceno; Douglas E. Albertson, and Lewis A. Haws, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Continuation of Ser. No. 92,124, Sep. 2, 1987, which is a continuation-in-part of Ser. No. 901,447, Aug. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 637,259, Aug. 3, 1984, Pat. No. 4,619,276. This application Mar. 17, 1989, Ser. No. 325,672

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[5] A24D *1/00*; A24C *5/60*

U.S. Cl. 131—88 10 Claims



1. A method of manufacturing cigarettes comprising applying liquid additive foam to an otherwise finished cigarette before introducing the cigarette into its packaging.

4,966,171

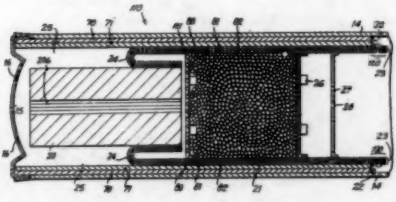
SMOKING ARTICLE

Mark A. Serrano, Greenwich, Conn.; Kenneth S. Houghton; Harry V. Lanzillotti, both of Midlothian, Va.; Edward B. Sanders, Richmond, Va.; A. Clifton Lilly, Jr., Chesterfield, Va.; Charles R. Hayward, Midlothian, Va.; John R. Hearn, and D. Bruce Losee, Jr., both of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 223,153, Jul. 22, 1988. This application Jan. 27, 1989, Ser. No. 315,822

Int. Cl.[5] A24D *1/00, 1/02, 1/18*

U.S. Cl. 131—194 40 Claims



1. A smoking article having a mouth end and a distal end remote from said mouth end, said smoking article comprising:

an active element at said distal end in fluid communication with said mouth end, said active element comprising:

a substantially non-combustible substantially cylindrical hollow sleeve having internal and external walls, and having a first end at said distal end and a second end closer to said mouth end,

a heat source contained in said sleeve adjacent said first end, said heat source having a fluid passage therethrough,

a flavor bed in said sleeve adjacent said second end thereof, in radiative and convective heat transfer relationship with said heat source, and

spacer means spaced apart from said heat source for maintaining said flavor bed in spaced-apart relationship with said heat source; wherein:

said sleeve is airpermeable adjacent said heat source for admitting air to support combustion of said heat source, and is air-impermeable adjacent said flavor bed to prevent combustion of material in said flavor bed; whereby:

when said heat source is ignited and air is drawn through said smoking article, air is heated as it passes through said fluid passage, said heated air flowing through said flavor bed, releasing a flavored aerosol, and carrying it to said mouth end.

4,966,172

FLAVOR COMPOSITIONS AND TOBACCO PRODUCTS CONTAINING 3,5,5,6,8,8-HEXAMETHYL-1,2,3,4,5,6,7,8-OCTAHYDRO-2-NAPHTHALENONE

Jean-Pierre Bachmann, Bäch, and Mario Pesaro, Zurich, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Filed Mar. 14, 1986, Ser. No. 839,753

Claims priority, application Switzerland, Mar. 25, 1985, 1304/85

Int. Cl.[5] A24B *3/12*

U.S. Cl. 131—276 4 Claims

1. A flavor composition comprising a flavoring effective amount of 3,5,5,6,8,8-hexamethyl-1,2,3,4,5,6,7,8-octahydro-2-naphthalenone and at least one other flavor ingredient.

4,966,173

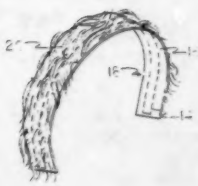
HAIRPIECE FOR COMPENSATION OF HAIR LOSS

Della L. Russell, 1995 N. 2000 West, Ogden, Utah 84404

Filed Aug. 30, 1989, Ser. No. 400,477

Int. Cl.[5] A41G *5/00*

U.S. Cl. 132—54 8 Claims



1. A hairpiece consisting of:

a frame member for placement on a user's head, said frame member being fabricated from a resilient material and having an inverted "U" shaped configuration shaped to conform to and bias against said user's head; said frame member having a length, an inner surface and an outer surface;

a foundation member attached to said frame; said foundation member consisting of:

a first ply of fabric having at least one longitudinal edge, said first ply of fabric ply of fabric being positioned on said frame member's inner surface to extend along a selected length of said inner surface, said first ply of fabric forming a smooth uninterrupted surface, said first ply of fabric being fabricated from a material which is soft and nonabrasive to sensitive skin; and

a second ply of fabric having at least one longitudinal edge, said second ply of fabric having positioned on said frame member's outer surface to extend along said selected length of said outer surface, said second ply of fabric being positioned to align its said longitudinal edge with said longitudinal edge of said first ply of fabric, said second ply of fabric being joined to said first ply of fabric by stitching said longitudinal edges together;

said foundation member being positioned on said frame member to register with an area of hair loss on said user's head when said frame member is placed on said user's head for concealment of said area of hair loss; and

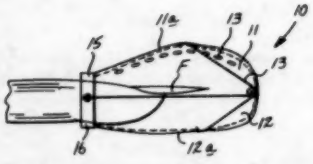
hair attached to said foundation member.

4,966,174

FINGERNAIL PROTECTOR

James J. Stanczak, 1802 East Campobello Dr. #101, Phoenix, Ariz. 85022

Filed Aug. 11, 1989, Ser. No. 392,412
Int. Cl.[5] A45D 29/00
U.S. Cl. 132—73 6 Claims



1. A fingernail protector comprising,

an upper shell formed with a convex upper surface with the upper surface coextensively formed with the shells and including a semi-annular upper entrance opening.

and

a lower shell formed with a planar bottom surface and including a semi-annular lower entrance opening, and the upper and lower shells defining a completely enclosing unit when secured about an individual's finger in a closed first position,

and

the upper and lower entrance openings aligned to form a continuous annular opening,

and

a latch means for selective securement of the upper and lower shells together,

and

the upper and lower shells pivotally secured together at their forward ends including a spring to bias the upper and lower shells in a spaced second position,

and

wherein the latch means includes a plurality of rigid latch rods mounted to the upper shell diametrically opposed to one another on opposite sides of the upper entrance opening and receivable within the lower shell about the lower entrance opening,

and

wherein the latch means further includes a latch plate formed with a series of aligned openings positioned within the lower entrance opening in alignment with the rigid rods to secure the rigid rods relative to the respective latch plate openings, each of the plurality of rigid rods is formed with a spherical lower terminal end receivable within one of the latch openings formed within the latch plate,

and

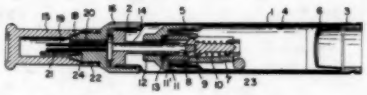
further including a release button secured on opposite sides of the lower entrance and the release button including a series of projections, each of the projections aligned with the respective latch openings wherein the release button ejects the spherical end of the rigid latch rod from a respective latch opening when the release projections are directed into the latch openings.

4,966,175

HAIR COSMETICS COATING TOOL

Masaru Kimura, Gunma; Yoshiomi Konose, Fujioka, and Yuji Nakamura, Saita, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 135,410, Dec. 21, 1987, abandoned.
This application May 22, 1989, Ser. No. 355,826
Claims priority, application Japan, Dec. 9, 1986, 61-189638[U]; Dec. 9, 1986, 61-189639[U]
Int. Cl.[5] A45D 24/22, 24/16
U.S. Cl. 132—112 6 Claims



1. A hair cosmetic coating tool which comprises:

(a) a main cylindrical body;

(b) a cylindrical reservoir member for storing liquid hair cosmetics and slidably mounted in said main body;

(c) an applicator head having two rows of plural brush tufts implanted therein and extending forwardly therefrom with individual bristles for each tuft converging at the tip to control the liquid application;

(d) a supply means communicating from said reservoir member to said brush tufts to supply cosmetic liquid to said brush tufts;

(e) a valve unit to control said supply means having a knocking member mounted at the rear end of said main body; and

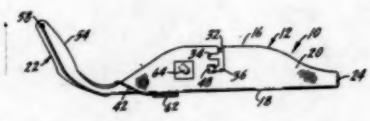
(f) a comb member having teeth extending forwardly from said applicator head for a distance greater than the length of said brush tufts and disposed adjacent to one of said two rows of said brush tufts, said teeth being bent toward said one of said two rows of brush tufts so as to contact with the brush tufts of that row.

4,966,176

DENTAL FLOSSER

James A. Lachenberg, 508 Roberts Dr. - 2A, Glenwood, Ill. 60425

Filed Dec. 22, 1988, Ser. No. 288,631
Int. Cl.[5] A61C 15/00
U.S. Cl. 132—325 3 Claims



1. In a dental floss applicator for holding and applying dental floss between the teeth of a user in a dental floss operation, a generally longitudinally elongated handle body shaped to fit the hand of a user, an extended portion at one end having forked laterally spaced opposed arms, laterally opposed openings in the arms through which the dental floss extends in a direction lateral to the handle body, a dead end on the handle body around which the free end of the floss may be wrapped and snubbed after passing through the opposed openings in the arms, a cavity in the handle body with opposed lateral side walls, an opening in a top wall of the handle body to admit a spool of floss into the cavity, opposed lateral slots in the side walls of the cavity opening in the opening and having two pairs of opposed spaced forwardly directed offsets in the side walls, one pair of offsets being more remote from the opening than the other pair, a flanged spool of dental floss with an

trunnions and trunnions thereon acting as a floating axle thereof in the cavity for paying out floss to the opposed openings in the arms, the axle freely fitting in the other pair of offsets to allow the spool to freely turn during threading of the floss to and between the forked arms, and a ratchet mechanism between at least one of the spool flanges and the handle body operative only when the trunnions are in the said one pair of offsets to automatically and releasably tension the floss and hold the spool against rotation after the user has secured the floss or the dead end when the trunnions of the spool are in the said one pair of offsets.

4,966,177

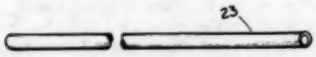
ULTRASONIC TUBE CLEANING SYSTEM

Clarence D. John, Jr., Penn Hills Twp.; Beverly T. Jarabak, Murrysville, and Joseph G. Cigich, Salem Township, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 07/205,520, Jun. 13, 1988, abandoned, which is a continuation of Ser. No. 06/799,684, Nov. 19, 1985, abandoned. This application Sep. 28, 1989, Ser. No. 414,637

Int. Cl.[5] B08B *9/02*

U.S. Cl. 134—61 **14 Claims**



1. A system for ultrasonically cleaning tubes, comprising:

(a) a cleaning tank holding a quantity of liquid and having a tube receiving end located above said liquid;

(b) means for generating ultrasonic cavitation energy within said liquid in said tank;

(c) stationarily-disposed means defining a switchback path leading into said liquid from said tube receiving end of said tank above said liquid for delivery tubes by gravity individually in single file fashion from said tube receiving end of said tank into said liquid within said tank;

(d) means stationarily-disposed and submerged in said liquid defining a generally linear inclined path for feeding said tubes by gravity in single file fashion from said switchback path across said tank within said liquid therein such that each tube will pass through and be cleaned by said cavitation energy in said liquid, said tube feeding means having opposite tube receiving and accumulating ends and including stop means disposed at said tube accumulating end for stationarily accumulating tubes upstream of said stop means in the same single file fashion as they are fed along said linear path for said switchback path; and

(e) means located adjacent said tube accumulating end of said tube feeding means for removing said tubes at said tube accumulating end thereof from said liquid within said tank, said tube removing means including

(i) a plurality of flexible members extending generally parallel to one another and being laterally spaced apart from one another, said flexible members being operable for movement about endless paths extending between said tube accumulating end of said tube feeding means and a tube discharge location above said tank, and

(ii) corresponding pairs of tube cradles attached to said flexible members at locations thereon being spaced apart by distances equal to approximately one-half the lengths of said flexible members such that corresponding ones of said cradles in said pairs thereof are disposed in an unloading position adjacent said tube discharge location when corresponding other of said cradles in said pairs thereof are disposed in a loading position adjacent said tube feeding means at said tube accumulating end thereof, said corresponding cradles in said pairs thereof being adapted to travel in endless paths, as said flexible members move about their endless paths, so as to pass adjacent said stop means and intersect with only a leading one of the tubes being stationarily positioned in single file fashion upstream of said stop means at said tube accumulating end of said tube feeding means such that said corresponding cradles in said pairs thereof will pick up only the leading one tube at a time.

4,966,178

TENT MOVABLE BETWEEN A COLLAPSED POSITION AND A LATCHED ERECT POSITION

Anthony E. Eichhorn, East Amherst, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Sep. 14, 1989, Ser. No. 407,363

Int. Cl.[5] E04H *15/40*

U.S. Cl. 135—104 **7 Claims**

1. A tent movable between a collapsed position and a latched erect condition, comprising:

a flexible tent body;

tent poles for supporting the tent body;

holding means for releasably attaching one end of the tent poles to the tent body;

apex junction means for supporting the opposite ends of the tent poles, the apex junction means including;

a base member;

a plurality of adapters mounted on one of the ends of the tent poles;

a cap member movably mounted on the base member and adapted when pressed downwardly to engage the adapters and to bend and tension the tent poles for placing the tent body in an erect position; and

latch means movable between a normal unlatched position to a latched position for latching the tent poles in a tensioned position and the tent body in its erect position.

4,966,179

EMERGENCY UMBRELLA

Blair F. Baldwin, New York, N.Y.; W. Barton Baldwin, Newport, R.I.; William C. Lamson, Huntington, Conn.; Harold M. Miller, East Greenwich, and John J. Grenga, Greenville, both of R.I., assignors to Bexel Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 126,207, Nov. 27, 1987, Pat. No. 4,842,003. This application Mar. 22, 1989, Ser. No. 327,328

Int. Cl.[5] A01G *13/02*

U.S. Cl. 135—19.5 **22 Claims**

1. An umbrella comprising:

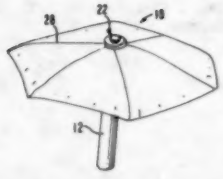
a hollow tubular handle;

a hub slidably containe in said handle between an upper extended position and a lower stored position;

a plurality of flexible struts, each having a fixed end and a free end, each strut having first dimensions at said fixed end and second dimensions at said free end which are less than said first dimensions;

locking means for rigidly and fixedly securing said fixed end of said strut to said hub in a non-pivotal manner;

cord means extending peripherally about said umbrella and connected to said struts for applying a tensioning force to said strut so as to bend said struts with said struts bending to a greater extent at said free ends;



cord attaching means connected on the free end of each strut for securing said cord means thereto; and

a web of flexible, water-resistant material connected to said tensioned struts.

4,966,180

EXPANSIBLE TYPE TRIANGULAR UMBRELLA RIBS AND THE RELATED COLLAPSING MECHANISM

Chenmin Lai, 2, Alley 2, Lane 102, Dong Hwa St., Taipei, Taiwan

Filed Oct. 11, 1988, Ser. No. 255,464
Int. Cl.[5] A45B *19/00*
U.S. Cl. 135—25 R **4 Claims**

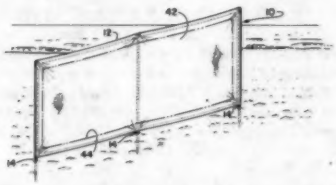
1. Expansible type triangular umbrella ribs and the related collapsing mechanism, comprised of an upper nest plate, a lower nest plate, a central shaft, a first main rib, a second main rib, an auxiliary rib, a linking rib, a first support rib, a flexible rib, and a terminal rib, said upper nest plate being fixedly mounted at a top section of the central shaft, said lower nest plate being mounted to the central shaft by a slip joint for sliding therealong, a front end of the first main rib and the second main rib connected to the upper nest plate and the lower nest plate respectively, a front end of the auxiliary rib is connected to the upper nest plate and a rear end of the auxiliary rib is connected to a middle portion of the second main rib, said first main rib comprising an expansible rib set in a U-channel, a rear end of the second main rib is pivotally connected to a front end of the linking rib, the rear end of the first main rib being arranged to penetrate through the front portion of the linking rib for sliding displacement therealong; by means of respective pivotal connection, the first main rib, the linking rib and the first support rib forming a triangular linked umbrella rib structure, the first support rib being arranged to provide a prolonged flange at a front U-channel for receiving the connection at the rear portion of the linking rib to reinforce the pivotal connection; the first main rib, the linking rib and the first support rib being arranged in a straight line at the time the umbrella is opened, in order to minimize the interval and the torsional force, to reinforce the rib structure, and the extend the durability of the umbrella, the front end of said flexible rib is connected to the rear portion of the linking rib by hook joint, the rear end of the flexible rib being connected with the front end of the terminal rib by a pivotal joint, the middle portion of the flexible rib winding around the central part of the first support rib by means of flexible winding around the first support rib, the flexible rib being slideable therealong when the umbrella is opened or collapsed.

4,966,181

BEACH WIND-SHIELDING AND SIGNALLING DEVICE

Michael Liberman, and Gary Kann, both of 935 Northern Blvd. Suite 300, Great Neck, N.Y. 11021

Filed Feb. 12, 1990, Ser. No. 478,553
Int. Cl.[5] E04H *15/00*
U.S. Cl. 135—87 **1 Claim**



1. For use on a beach, a combination wind-shielding and location-indicating device comprising three poles having an operative position inserted in the sand of the beach providing each pole with a vertical orientation and having a triangular spaced relation to each other, a rectangular fabric member having a leeward side and a windward side with two opposite side and top and bottom edges disposed in supported relation on said poles so as to serve as a wind shield against any directional wind of said beach to any user of said device located on the leeward side of said fabric member in relation to said directional beach wind, said two opposite sides and top and bottom edges of said rectangular fabric body being folded over and a Hadred inwardly of the edges of said fabric so as to form tubular configurations along said edges, said tubular configurations along the opposite sides of said fabric body being closed by a top tubular configuration so as to se e as enclosures for receiving two of said side poles in projected relation therein to provide support along the opposite side edges of said fabric body, and in a medial location in said fabric body an unstitched portion of the upper tubular configuration serving as an enclosure for receiving in projected relation the top of the remaining pole and in alignment with said first unstitched tubular portion a second unstitched portion in said lower tubular configuration serving as an enclosure for receiving in projected relation the lower portion of the remaining pole so as to provide support for the center of said fabric body, and color indicia in a delineated display area on the windward side of said fabric member to serve as a location-indicating visual signal.

4,966,182

METHOD AND APPARATUS FOR DE-GELLING A LIQUID MIXTURE

Grant E. Lavelle, Wood Haven; Charles Rossio, Carleton; Dwight Davis, Detroit, all of Mich., assignor to Diversey Corporation, Wyandotte, Mich.

Filed Dec. 19, 1988, Ser. No. 286,335
Int. Cl.[5] F01M *1/00*
U.S. Cl. 137—1 **9 Claims**

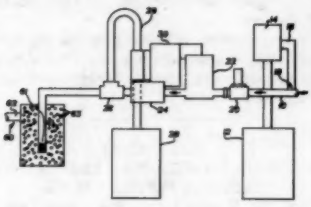
1. A multiple component liquid lubricant delivery system for delivering a flow of a liquid solution containing a lubricant concentrate and a diluent to a conveyor means for lubrication thereof, the delivery system including an apparatus for de-gelling the solution, comprising:

means interposed the flow of the solution for agitating the solution.

the means for agitating including a valve which comprises:

a main body having an inlet and outlet and a fluid passage

therethrough connecting the inlet to the outlet for fluid flow therebetween;



means in the fluid passage for resisting the flow of fluid therethrough; and

means for biasing the flow resisting means towards the inlet.

4,966,183

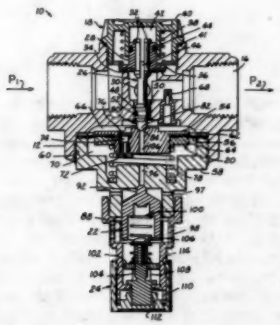
PRESSURE REGULATOR

Felton Williamson, Jr., Fraser, Mich., assignor to Master Pneumatic-Detroit, Inc., Sterling Heights, Mich.

Filed Nov. 6, 1989, Ser. No. 432,810

Int. Cl.[5] G05D *16/00*

U.S. Cl. 137—116.5 **9 Claims**



1. A gas pressure regulator comprising, a body, a gas inlet port in said body, a gas outlet port in said body, a main valve assembly carried by said body, communicating with both said inlet port and said outlet port, movable to closed and open positions and constructed and arranged when fully closed to prevent the flow of gas from said inlet to said outlet, a diaphragm carried by said body and operably connected with said main valve for moving it toward one of its open or closed positions in response to a slight change in pressure of a compressed gas in said outlet passage, a first dome enclosing one side of said diaphragm and continuously communicating with said outlet passage so that compressed gas therein acts on said one face of said diaphragm, a second dome enclosing the other face of said diaphragm and constructed and arranged so that compressed gas therein acts on said other face of said diaphragm, a restricted orifice communicating with both of said domes to continuously bleed compressed gas from said first dome into said second dome, and a relief valve continuously communicating with said second dome and constructed and arranged to open at a predetermined pressure of gas in said second dome to bleed gas from said second dome, whereby when compressed gas is supplied to said inlet, compressed gas can flow through said outlet at a reduced pressure which is regulated to a substantially constant pressure by the cooperation of said main valve, diaphragm and relief valve.

4,966,184

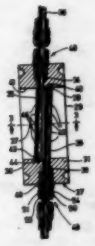
SYSTEM TO AVOID ICING IN THE DISCHARGE PIPING OF A PRESSURE RELIEF VALVE

Gary J. Giles, Pineville, La., assignor to Dresser Industries, Inc., Dallas, Tex.

Division of Ser. No. 267,416, Nov. 4, 1988, abandoned. This application Aug. 29, 1989, Ser. No. 400,196

Int. Cl.[5] B01F *3/00*

U.S. Cl. 137—205.5 **7 Claims**



1. A member flow-connectable with the piping of a discharge fluid flow system, said member comprising spaced apart upstream and downstream ends connected together by a generally cylindrical wall to define a flow path for fluid through said system, first and second probe ports substantially diametrically spaced from each other and extending through said wall, a first tubular probe mounted within said first probe port and having an inner end portion extending substantially across said flow path in a non-perpendicular direction relative to the central axis of said member, said inner end portion having a plurality of inlet orifices opening from one side thereof and facing at least partially toward said upstream end of said member to communicate a high fluid flow pressure in said flow path to the interior of said first probe, a second similar probe mounted within said second probe port and having an inward end portion extending substantially across said flow path in a non-perpendicular direction relative to the central axis of said member, said inward end portion having a plurality of outlet orifices opening from one side thereof and facing at least partially toward said downstream end of said member to communicate a low fluid flow pressure lower than said high fluid flow pressure in said flow path to the interior of said second probe, said first and second probes having outer ends connectable to a source of anti-solidifying fluid pressurizable by a driving pressure derived from the difference between said high and low pressures to drive said anti-solidifying fluid from said source, through said second probe and into the flow path of the discharge fluid flowing through said member, and connector means securing one of said probes to said member for selectively orienting the direction which the orifices of said one probe face between a first position facing in a generally longitudinal direction relative to said flow path and a second position facing in a generally perpendicular direction relative to said flow path to thereby selectively set said driving pressure at a value less than the maximum discharge fluid flow pressure difference obtainable between said first and second probes.

4,966,185

INFLATABLE BODY WITH A VALVE AND A PACKAGING WITH SUCH A BODY

Henk Schram, Zuideinde 161, 1551 EE Westzaan, Netherlands

Filed Jan. 6, 1989, Ser. No. 294,118

Claims priority, application Netherlands, Jan. 6, 1988, 8800020

Int. Cl.[5] F16K *15/14*

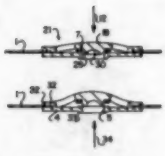
U.S. Cl. 137—223 **6 Claims**

1. The combination of a gas-inflatable body which has an

orifice and an inner surface and an outer surface, and a valve for opening and closing the orifice, said valve comprising:

an outer plate which has a central gas passage therein and a rim, the outer plate extending across the orifice in said body and being in sealing contact with the outer surface of said body,

an inner plate which defines a central hole and is in sealing contact with the inner surface of said body around said orifice,



a central valve body portion within said central hole and connected to said inner plate by a plurality of wings which define a plurality of gas inlets, and

a sealing ring positioned between the central valve body portion and the central gas passage of the outer plate for sealing closed the central gas passage in the outer plate when the inner plate is moved towards the outer plate, while movement of the central valve body portion away from the outer plate enabling a flow of gas to pass through the central gas passage and the gas inlets.

4,966,186

CARTRIDGE VALVE

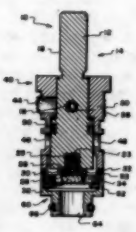
Harvey Rodstein, Los Angeles, Calif., assignor to Harden Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 144,781, Jan. 20, 1988, Pat. No. 4,823,832. This application Apr. 21, 1989, Ser. No. 342,452

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[5] F16K *27/00*

U.S. Cl. 137—454.5 **2 Claims**



1. In a disc-type valve cartridge which includes a cartridge body member having, at a first end, exterior threads for installing the cartridge in a housing within which the flow of a fluid is to be controlled, an elongated passageway through the cartridge body member, a stem rotatable within the passageway and having handle means at one end thereof, and first and second discs disposed at a second end of the stem at the other end of the cartridge body member, the discs each having a valving face and a support face, the disc valving action being in face-to-face relationship, and the discs being relatively rotatable about the axis of the stem to provide a valving action between the disc valving faces, the first disc having its support face directed toward and secured to the other end of the stem to rotate therewith, the improvement comprising:

a disc retainer member holding the second disc with the second end of the cartridge body member in non-rotatable relation thereto, the second end of the cartridge body member having exterior threads formed thereon, and said disc retainer member having mating interior threads for purpose of its securement to the cartridge body member, and providing an axial force against the support face of the second disc; and,

a biasing spring member engaged between the support face of one of the discs and the member toward which such support face is directed so as to apply face-to-face sealing pressure between the discs.

5,966,187

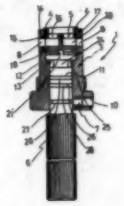
VALVE BODY CONCERNING THE BATHTUB COLD/HOT WATER VALVE

Men-Shun Wah, No. 4, Alley 1, Lane 504, Chung Yang Rd., Nan Kan District, Taipei, Taiwan

Filed Nov. 7, 1989, Ser. No. 432,633

Int. Cl.[5] F16K *11/06*

U.S. Cl. 137—454.5 **8 Claims**



1. An improved valve body concerning the bathtub cold/hot water valve, which comprises a housing, a connection sealing ring, a ceramic valve, an operation bar, and a set screw, is improved structurally on the housing, which is a hollow cylinder in a length and is provided with two cross, positioned oppositely, rectangular outlets in the front part, adapted to the V-shape outlet of the turning body of ceramic valve inside the housing; the rear of the housing provided with a hexangular head, where on one side there is provided a screw hole for a flush-headed set screw to insert thereto and extend into an annular flute of operation bar to control it to during turning without moving forward and backward; at a mid suitable position of the inner wall of the housing, there being provided an annular flange, which comes to shoulder an extended piece of the front of operation bar, and is provided with positioning convex points, positioned oppositely, in adaption for the flat bar of a length of operation bar, to control the operation bar's turning angle scope and ceramic valve's open and close states; at the housing inside front end, an annular shoulder provided to be set with a sealing ring, which extends a suitable length from there when set, for the close connection with the end face of the connection base of housing of the cold/hot water valve system to connect with water supply pipe.

4,966,188

PNEUMATICALLY OPERATED GAS-PRESSURE CONTROLLER

Rudolf Fischer, Kassel, and Josef Gartner, Sohrewald, both of Fed. Rep. of Germany, assignors to Regal + Messtechnik GmbH, Kassel, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,583

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828002

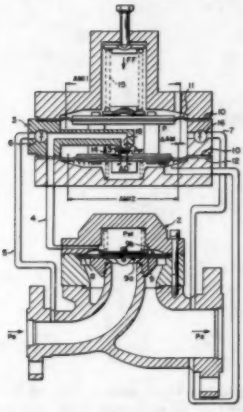
Int. Cl.[5] G05D *16/16*

U.S. Cl. 137—489 **2 Claims**

1. A pneumatically operated gas-pressure controller, comprising:

a setting device;

a controller, coupled to said setting device, wherein the controlling gas for the energy supply of the controller is drawn on the input side of the gas-pressure controller, fed to the controller by means of a throttle valve and discharged on the outlet side by means of a drain conduit, and the controller supplies the setting pressure for the setting device by means of a setting pressure conduit, said controller including a twin diaphragm system having two diaphragms with different surface areas, said two diaphragms being interconnected and arranged one above the other so as to oppose one another;



a booster valve associated with one of the two diaphragms of the twin diaphragm system of the controller, said diaphragm associated with said booster valve having a smaller surface area than the other, oppositely disposed diaphragm, said booster valve having a baffle plate connected with the smaller surface area diaphragm and a nozzle having a defined cross-section, said booster valve being acted upon by the setting pressure; and

a throttle valve defined in said drain conduit.

4,966,189

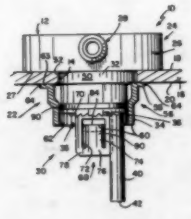
TANK VALVE MOUNTING ASSEMBLY

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Oct. 24, 1989, Ser. No. 426,320

Int. Cl.[5] F16K *24/02*

U.S. Cl. 137—587 **17 Claims**



1. An assembly for mounting a vent valve apparatus in an aperture extending through a wall of a tank containing vapor to be vented, the assembly comprising

a collar depending from an inner side of the wall to extend into the tank, the collar being formed to include a central passage communicating with the aperture formed in the wall,

means on the vent valve apparatus for engaging an outer side of the wall upon insertion of the vent valve apparatus into the aperture to establish a mounting position of the vent valve apparatus relative to the wall,

means on the vent valve apparatus for retaining the vent valve apparatus in its mounted position, the retaining means being positioned in the tank to engage the collar so that the wall and collar are clamped between the engaging means and the retaining means, and

wherein the collar includes an elongated sleeve having an interior surface defining the central passage and a flange appended to one end of the elongated sleeve, and the flange is connected to the inner side of the wall to establish a vapor seal interconnecting the wall and the collar so that vapor in the tank must pass through the central passage in the collar before it exits the tank through the aperture passage.

4,966,190

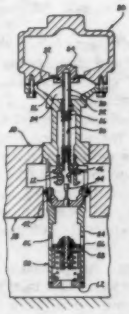
CHECK VALVE FOR A LEAK DETECTOR

Penrod C. Geisinger, Dewey, Ariz., assignor to Vaporless Manufacturing, Inc., Prescott Valley, Ariz.

Filed Mar. 20, 1990, Ser. No. 496,546

Int. Cl.[5] F16K *31/12*

U.S. Cl. 137—613 **18 Claims**



1. A check valve for protecting and for enhancing operation of a leak detector disposed downstream of a pump and having an outlet in fluid communication with a dispensing line of a retail gasoline or product dispensing system, said check valve comprising in combination:

(a) a cylinder depending from the outlet of the leak detector for receiving product from the leak detector;

(b) at least one aperture disposed in the wall of said cylinder for establishing fluid communication between the interior of said cylinder and the dispensing line;

(c) a piston disposed within said cylinder, said piston being translatable to a first position for blocking flow through all of said at least one aperture and to a second position for accommodating flow from the leak detector into said cylinder and through said at least one aperture into the dispensing line as a function of the difference in pressure upstream and downstream of said piston; and

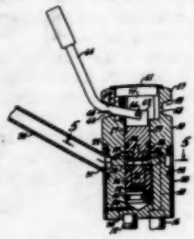
(d) means for biasing said piston into the second position.

4,966,191

MIXING VALVE ASSEMBLY FOR SINGLE-HANDLE FAUCETS

Sohiel Azizi, 14 Wildbrook St., Irvine, Calif. 92714

Filed Jan. 20, 1989, Ser. No. 368,661
Int. Cl.[5] F16K *11/078*
U.S. Cl. 137—625.17 14 Claims



1. A combination liquid-mixing and flow-control valve of the single-actuator type, which comprises:

(a) a valve body having a cylindrical bore therein,

(b) a valve element mounted coaxially in said bore for longitudinal and rotational movement therein in response to shifting of an actuating means for said valve element,

said valve element having spaced apart end portions mounted sealingly in said bore,

said end portions being connected by a stem,

(c) means to separately conduct two classes of liquids through said valve body to first and second inlet ports though the wall of said bore,

(d) outlet port means through said wall of said bore,

said outlet port means being spaced from said inlet ports,

said outlet port means communicating with a single outlet element from said valve body,

(e) shut-off seal means and ported seal means mounted around said stem,

said seal means being generally cylindrical,

at least said ported seal means being adapted to rotate with said stem as said valve element is rotationally moved by said actuating means,

said shut-off seal means being adapted to sealingly block said outlet port means when said valve element is in a predetermined longitudinal position in said bore,

the material and the thickness of said shut-off seal means, and the size of said outlet port means, being so related to the expected liquid pressures in the valve that said shut-off seal means will not balloon into said outlet port means, and

(f) port means through said ported seal means to selectively conduct liquid from said first inlet port to said outlet port means, and from said second inlet port to said outlet port means, and from both inlet ports to said outlet port means, depending on the rotated position of said valve element, when said valve element is in a longitudinal position in said bore different from said predetermined longitudinal position therein.

4,966,192

ROTARY DIRECTIONAL CONTROL VALVE

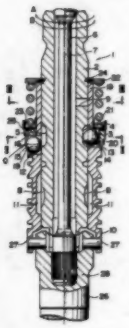
Hirotaka Umeda, Nagoya, Japan, assignor to TRW Steering & Industrial Products Co., Ltd., Japan

Filed Sep. 20, 1989, Ser. No. 410,152
Claims priority, application Japan, Oct. 17, 1988, 63-261126
Int. Cl.[5] F15B *13/02*
U.S. Cl. 137—625.23 3 Claims

1. A rotary directional control valve comprising:

a cylindrical input shaft which is formed with ball fitting groove means in one portion of an outer peripheral surface thereof and with an inner valve in another portion of the outer peripheral surface thereof axially apart from said ball fitting groove means and an outer valve which is fitted on a portion of said input shaft adjacent to its one end, fixed at one end thereof to one end of an output shaft, and formed at the other end thereof with cam surfaces, said inner and outer valves defining therebetween a variable orifice which serves to change the flowing direction and pressure of hydraulic fluid in accordance with rotation of said input shaft with respect to said outer valve,

said control valve further comprising a ring mechanism which is formed in an inner peripheral surface thereof with ball fitting grooves which cooperate with said ball fitting groove means of said input shaft through first balls to regulate the relative position of said ring mechanism



with respect to said input shaft in a radial direction thereof and on an end surface thereof with cam surfaces which cooperate with said cam surfaces of said outer valve through second balls to restrict the rotation of said input shaft in the circumferential direction threof with respect to said outer valve,

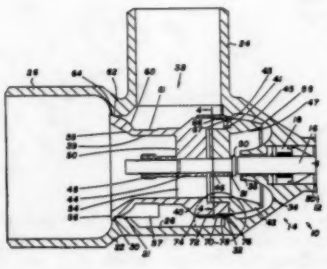
said ring mechanism including ring means which is formed with said cam surfaces on one end surface thereof and rotatable in the circumferential direction with respect to said input shaft and, further, fixing means for fixing said ring means to said input shaft in a condition that said input shaft is set in a desired angular position with respect to said outer valve.

4,966,193

TIMING CONTROL FOR A DUAL POPPET VALVE

Hugo N. De Campos, Granger, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Jan. 30, 1990, Ser. No. 472,581
Int. Cl.[5] F16K *11/04*
U.S. Cl. 137—625.35 8 Claims



1. In a valve having a housing with a cavity therein, said

housing having an entrance port connected to a source of fluid and an outlet port connected to a fluid system, said housing having a first seat and a second seat, said valve having first and second poppets connected to an actuation member for moving the first and second poppets with respect to said first and second seats, respectively, to control the flow of fluid from the entrance port to the outlet port, the improvement comprising:

a cylindrical body having a peripheral surface with a first curved section adjacent a first end to define said first poppet and a groove adjacent said second end, said cylindrical body having a center hub connected to the peripheral surface with a series of radial spokes, said actuation member being connected to said center hub;

a sleeve member having a body section which is concentric to said peripheral surface on said cylindrical body, a flange section that extends into said groove on said cylindrical body and a second curved surface that radially extends from the flange section, said second curved surface defining said second poppet; and

a flexible member located in said groove, said flexible member urging said sleeve member toward a stop on said cylindrical body, said actuation member moving said cylindrical body to allow fluid to flow directly from said cavity between said first seat and first poppet and between said second seat and second poppet, around said second end and through the interior of said cylindrical member to be combined with the fluid flow past the first seat and first poppet for distribution to said outlet port, said actuation member terminating the flow of fluid to the outlet port by moving said cylindrical member such that said second curved surface initially engages said second face to interrupt flow through said cylindrical body and thereafter compresses said flexible member until said first curved surface engages said first face to interrupt the direct flow of fluid to the outlet port, said compressed flexible member sealing said groove to prevent fluid leakage from said cavity into said fluid system.

4,966,194

FOUR-WAY SWITCHING VALVE DEVICE

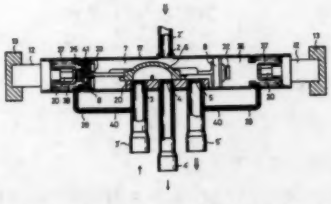
Keiichiroh Nakatsukasa, and Takao Matsumoto, both of Tochigi, Japan, assignors to Ranco Japan Ltd., Tokyo, Japan

Continuation of Ser. No. 329,651, Mar. 28, 1989, abandoned. This application Mar. 13, 1990, Ser. No. 494,922

Claims priority, application Japan, Jul. 13, 1988, 63-172595; Jul. 18, 1988, 63-176970

Int. Cl.[5] F16K *11/06*

U.S. Cl. 137—625.43 **15 Claims**



1. A four-way switching valve device which comprises a valve chamber composed of at least a liquid inflow port for allowing only an inflow of liquid into said valve chamber and provided on a side wall of said valve chamber and a plurality of ports including at least a liquid outflow port for allowing only an outflow of liquid from said valve chamber and a plurality of liquid inflow and outflow ports, said plurality of ports being provided on a side wall of said valve chamber at a distance from said liquid inflow port, and a liquid flow-direction switching means prtovided inside of said valve chamber and arranged in a vicinity of said plurality of ports and comprising at least a first valve member slidably mounted on said plurality of ports to selectively communicate between said liquid outflow port and one of said liquid inflow and outflow ports respectively, said valve device further including a piston portion fixedly mounted on at least one end of a connecting rod extending longitudinally along said valve chamber from said first valve member and sliding hermetically inside of said valve chamber, and a thermo-sensitive slow acting operation device provided on at least one end of said valve chamber and opposite to said piston portion, and further, a switching device for controlling at least an inflow of high pressure liquid into a cavity formed between said piston portion and said slow acting operation device in said valve chamber, said switching device being actuated in response to a movement of a working rod of said slow acting operation device to thereby cause the high pressure liquid to flow into said cavity and cause a movement of said first valve, whereby one of said plurality of liquid inflow and outflow ports in said liquid flow-direction switching means is selected to switch the communication to said liquid outflow port, wherein piston portions are provided at both ends of said connecting rod extending longitudinally inside said valve chamber from said first valve to slide hermetically inside the valve chamber integrally with said first valve and to make a hermetically sealed chamber, and said slow acting operation devices are provided at both ends of said valve chamber and opposite to said piston portions to form a differential pressure chamber between said piston portions and said slow acting operation device, said valve device further including sub valves provided as said switching device, said sub valve being opened by said working rod of said slow acting operation devices.

4,966,195

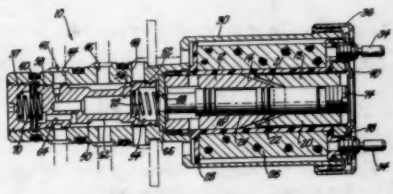
TRANSMISSION PRESSURE REGULATOR

Ralph P. McCabe, Troy, Mich., assignor to Colt Industries Inc., New York, N.Y.

Continuation of Ser. No. 66,693, Jun. 25, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 339,884

Int. Cl.[5] F16K *31/06, 31/40*

U.S. Cl. 137—625.61 **44 Claims**



1. A pressure regulating device for regulating the pressure of a flowing fluid medium, said device comprising: a stationary member, a movable armature means disposed axially from said stationary member for moving axially in relation to said stationary member, coil means disposed about said stationary member and said armature means and through which current flows for generating magnetic flux to create an attractive force to move said armature means in relation to said stationary member, housing means disposed about said coil means and said stationary member and said armature means for encasing said armature means and said coil means and said stationary member, aperture means for forming at least one aperture in said housing means to allow a fluid medium to enter and exit said housing means and to contact said armature means, flow valve means having first and second axially spaced ends being of a single diameter and one of said pair of ends being spaced axially from one end of said armature means for moving independently of said armature means to prevent parasitic forces from being transmitted by said flow valve means to said armature means; poppet valve means disposed axially between said flow valve means and said armature means for creating a re-

striction of fluid flow to said armature means; and biasing means disposed axially between said poppet valve means and said flow valve means for biasing said flow valve means axially away from said armature means to reduce oscillations between said armature means and said flow valve means.

4,966,196

BALANCED SERVO-OPERATED MULTIWAY VALVE

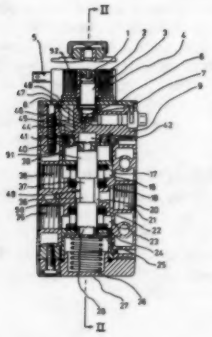
Ernst-August Meyer, Algermissen, Fed. Rep. of Germany, assignor to WABCO Westinghouse Steuerungstechnik GmbH & Co., Hanover, Fed. Rep. of Germany

Filed Dec. 12, 1989, Ser. No. 448,878

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1988, 3842633

Int. Cl.[5] F15B *13/043*

U.S. Cl. 137—625.64 13 Claims



1. An improved servo operated multiway valve of the type having:

(a) a central bore;

(b) a first fluid pressure connection connected with a first fluid chamber located along the central bore;

(c) a second fluid connection connected with second fluid chamber located along the central bore;

(d) a third fluid connection connected with a third fluid chamber located along the central bore;

(e) first valve means, through which the second fluid chamber may be selectively connected with the first fluid chamber and the third fluid chamber;

(f) a control piston in fluid communication with a control chamber the control piston moveable by pressure in the control chamber and engagable with the first valve means; and

(g) second valve means for controlling the fluid pressure in the control chamber;

the improvement comprising:

(i) a first check valve located between the second valve means and the first fluid chamber connecting the second valve means and the first fluid chamber when fluid pressure is present in the first fluid chamber;

(ii) a second check valve located between the second valve means and the third fluid chamber connecting the second valve means and the third fluid chamber when fluid pressure is present in the third fluid chamber, the first and second check valves arranged to supply fluid to the second valve means from the highest respective pressure and to isolate the second valve means from the lower pressure.

4,966,197

ONE-WAY VALVE

Michael Jaron, Des Plaines, and Lev Melinyshyn, Mt. Prospect, both of Ill., assignors to Uresil Corporation, Skokie, Ill.

Continuation of Ser. No. 97,171, Sep. 16, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 336,613

Int. Cl.[5] F16K *15/14*

U.S. Cl. 137—846 29 Claims

1. A one-way valve comprising:

two flat resilient members in face-to-face relationship with each other, said resilient members being bonded along two generally parallel tracks defining a passageway therebetween, each of said tracks having a tortuous profile along its inner edge,

each of said tortuous profiles converging toward the other more than once along said passageway; and

an inlet port at one end of said passageway and an outlet port at the opposite end of the passageway.

4,966,198

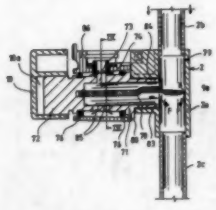
METERING ARRANGEMENT

John L. Hartstone, 3 Pycroft Place, St. Heliers, Auckland, New Zealand

Continuation-in-part of Ser. No. 882,457, Jul. 8, 1986, abandoned, which is a continuation of Ser. No. 732,511, May 9, 1985, abandoned. This application Aug. 2, 1989, Ser. No. 388,631

Int. Cl.[5] F16K *1/02*

U.S. Cl. 137—862 7 Claims



1. A diversion valve for use in a liquid metering arrangement, said valve having a liquid flow control means positionable within a liquid flow line to control the flow of liquid therepast, said flow control means movable between a first position providing substantially no obstruction to liquid flow through said flow line, to a second position at which a substantial proportion of liquid flowing in said flow line is diverted into and through a body of said valve, while a smaller proportion of said liquid is still permitted to flow past said flow control means, said valve body being rotatably mounted in a housing having a liquid outlet port therein, said valve body being rotatable with said flow control means, said valve body having a liquid outlet means in liquid flow connection with said outlet port when said flow control means is in second position but

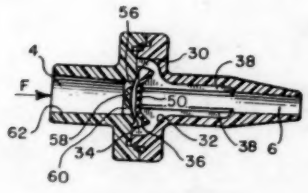
which connection is closed off when said flow control means is in said first position.

4,966,199

DIAPHRAGM-TYPE CENTER FLOW CHECK VALVE

Ricky R. Ruschke, McHenry, Ill., assignor to Filtertek, Inc., Hebron, Ill.

Filed Jun. 8, 1989, Ser. No. 363,602
Int. Cl.[5] F16K *15/14*
U.S. Cl. 137—843 **27 Claims**



1. A check valve for passing fluid flow in a forward direction from an upstream side of the valve to a downstream side, and for preventing fluid flow in a reverse direction, comprising:

a valve body defining a substantially axisymmetric chamber, with internal surfaces of the valve body defining a boundary of the chamber;

an imperforate flexible diaphragm disposed concentrically in the chamber;

the valve body having an inlet passage formed therein in fluid communication with the chamber and extending in the upstream direction from the chamber, the diaphragm being responsive to reverse flow into the chamber for blocking the fluid communication between the chamber and the inlet passage;

the valve body having an outlet passage formed therein extending from the chamber in the downstream direction; and

substantially axisymmetric diaphragm contacting means for contacting and supporting a downstream face of the diaphragm during forward flow, said axisymmetric means being spaced radially from the boundary of the chamber and from the periphery of the diaphragm, the axisymmetric means supporting the diaphragm such that the portion of the diaphragm that is disposed radially outwardly of the axisymmetric means may flex in a downstream direction about the axisymmetric means during forward flow to allow for the passage of fluid,

the axisymmetric means defining a reverse flow passage for guiding fluid to the center of the downstream face of the diaphragm during reverse flow,

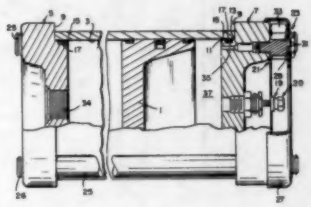
the axisymmetric means comprising at least one sharp edge effective to press into the diaphragm and inhibit lateral motion of the diaphragm, the at least one sharp edge being formed on a member disposed in the chamber, the member having a radially inner surface extending in a substantially longitudinal direction along said reverse flow passage to a place where it terminates in said sharp edge, the member further having a radially outer surface tapering inwardly in the upstream direction to a place where it meets said radially inner surface in said sharp edge.

4,966,200

TIE BOLT ACCUMULATOR WITH SAFETY VALVE

Terry Bents, Pocohontas, Iowa, assignor to Iowa Industrial Hydraulics, Inc., Pocahontas, Iowa

Filed Jan. 25, 1989, Ser. No. 301,115
Int. Cl.[5] F16L *55/04*
U.S. Cl. 138—31 **16 Claims**



1. A tie bolt accumulator comprising:

a cylindrical section having a smooth uninterrupted circumferential internal surface;

two end caps having cylindrical surfaces underlying sai smooth uninterrupted circumferential internal surface and with an external circumferential surface only slightly less large than the smooth circumferential surface of the cylindrical section and external surface areas extending radially outwardly of the cylindrical surface;

a piston located internally of the cylindrical section and sealing engaged therewith;

seal means on the cylindrical surfaces of the two end caps for sealing the cylindrical surfaces with the cylindrical smooth internal surfaces of the cylindrical section;

a plurality of tie bolt means extending between said end caps and externally of said cylindrical section for holding the external surfaces of said end caps against ends of the cylindrical section;

inlet fill means located on one end cap, for the admission of high pressure fluid to the tie bolt accumulator; and;

including preventive means for preventing disassembly of the end caps by the tie bolt means until the high pressure fluid admitted to the tie bolt accumulator has been released.

4,966,201

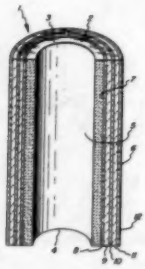
TRANSFER TUBE

Paul S. Svec, Scotia; Marcus P. Borom, Schenectady; Lawrence E. Szala, Scotia; Milivoj K. Brun, Ballston Lake; Steven A. Miller, Amsterdam, all of N.Y., and David P. Mourer, Danvers, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,411
Int. Cl.[5] F16L *9/14, 9/10*
U.S. Cl. 138—141 **17 Claims**

1. A transfer tube useful for transfer of molten metal comprised of a hollow high density tube having directly bonded only to its outer surface wall leaving no significant portion thereof exposed a continuous low density shell, said high density tube being comprised of polycrystalline ceramic oxide with a density of at least about 90% of its theoretical density, said high density tube having a passageway extending through its length with a cross-sectional area at least sufficient for transfer of molten metal therethrough, said shell being comprised of ceramic oxide with at least about 75 weight % of said shell being polycrystalline, said shell being comprised of a plurality of sequential layers directly bonded to each other, said sequential layers being comprised of at least two primary layers and at least one intermediate secondary layer disposed between said primary layers, the ceramic oxide grains in said primary layers having an average size which is significantly smaller than the average size of the ceramic oxide grains in said

intermediate secondary layer, said low density shell ranging in density from about 40% to about 80% of its theoretical density, said low density shell having a thermal expansion coefficient



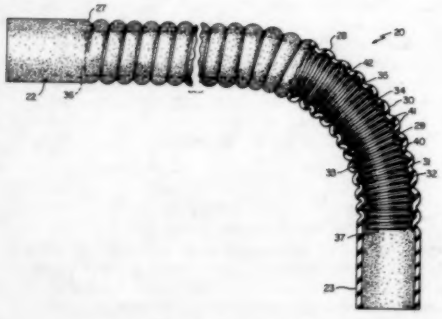
within about ±25% of the thermal expansion coefficient of said high density tube, said low density shell having a thermal conductivity ranging from about 10% to about 90% lower than that of said high density tube.

4,966,202

SHAPE RETENTION HOSE CONSTRUCTION

James S. Bryan, Clyde, N.C., and James B. Rush, Springfield, Mo., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Nov. 14, 1988, Ser. No. 270,990
Int. Cl.[5] F16L *11/14, 57/00*
U.S. Cl. 138—172 **6 Claims**



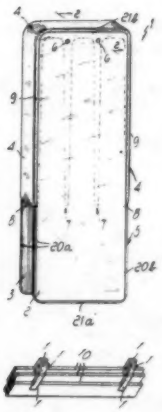
1. In a shape retention vehicle radiator hose construction comprising a length of flexible tubular hose formed mainly of polymeric material and having opposite end portions and an intermediate body portion that defines internal and external peripheral surfaces of said hose, said end portions comprising mounting cuffs of said hose construction, said body portion being corrugated, and shape retention means carried by just said body portion of said hose and being adapted to generally retain the shape of said hose construction when said hose and its carried shape retention means are jointly bent into a particular shape, the improvement wherein said shape retention means comprises a deformable metallic corrugated tubular member having opposed ends and a continuous sidewall between said ends that is thinner than said body portion of said hose and that defines internal and external peripheral surfaces of said tubular member and corrugations of said body portion of said hose, said hose and said tubular member being telescoped together with one of said surfaces of said tubular member being disposed closely adjacent one of said surfaces of said hose.

4,966,203

SEPARATOR STRUCTURE FOR GUIDING WEAVING LOOM HARNESS FRAMES

Elio Carrara, Cazzano Sant'Andrea, Italy, assignor to Lamiflex S.p.A., Ponte Nossa, Italy

Filed May 2, 1989, Ser. No. 346,199
Claims priority, application Italy, May 5, 1988, 20459 A/88; Nov. 10, 1988, 22581 A/88
Int. Cl.[5] D03C *9/06*
U.S. Cl. 139—91 **13 Claims**



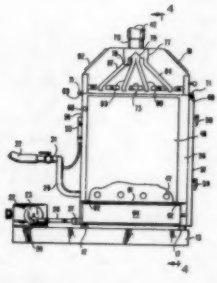
1. A separator structure in combination with a weave loom frame, the separator structure comprising a pair of spaced-apart parallel plate-like elements defining a periphery and a separate side member extending between said plate-like elements transversely thereto along a portion of the periphery of said plate-like elements, said plate-like elements being arranged astride and being coupled to the weave loom frame, said plate-like elements and said side member defining mutually cooperating coupling means to stably couple said plate-like elements and said side member.

4,966,204

CARBON FILTER TRAY FILLING MACHINE AND METHOD

Roy G. Pedigo, 214 Montclair St., Madison, Ind. 47250

Filed Jan. 26, 1989, Ser. No. 301,955
Int. Cl.[5] B65B *1/08*
U.S. Cl. 141—7 **9 Claims**



1. A carbon filter filling machine comprising:
a base;
a cabinet mounted on said base and having a fill chamber

therein to receive a filter cell for filling the cell with carbon, the cabinet having a top;

a filling head on the top of the cabinet for delivering carbon to the top of a filter cell in the cabinet;

and exhaust outlet means in the cabinet below the filling head to enable establishment of an air flow through the cabinet from the filling head through the fill chamber to the exhaust outlet means;

a shaker on the base and connected to the cabinet to oscillate the cabinet and thereby promote packing of the carbon in the filter cell;

the filling head further comprising:

a downwardly opening shell having a top and bottom and front and rear ends and an inlet port at the top;

a distributor box having a top and bottom and connected to the top of the shell and located under the port to receive carbon granules entering through the port;

a plurality of outlets in the bottom of said box; and

discharge passages from said outlets to spaced points near the bottom of the shell.

4,966,205

METHOD AND APPARATUS FOR CHARGING TRANSPARENT MATERIAL

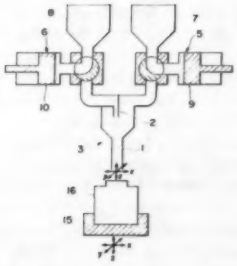
Yoshinori Tanaka, Shizuoka, Japan, assignor to Pola Chemical Industries Ltd., Shizuoka, Japan

Filed Dec. 14, 1988, Ser. No. 284,436

Claims priority, application Japan, Feb. 2, 1988, 63-22573

Int. Cl.[5] A61K *7/00*; B65B *3/04*

U.S. Cl. 141—9 **7 Claims**



1. A method of charging a transparent cosmetic material containing a three-dimensional pattern in which a coloring material is charged at the same time as a transparent gel base comprising a water-soluble polymer or inorganic gelatinizer is charged into a vessel so as to form a three-dimensional pattern in said transparent gel base, the method comprising:

charging said transparent gel base into a charging nozzle from a first supply source of said transparent gel base, as well as joining said coloring material charged from a second supply source thereof to said transparent gel base insaid charging nozzle; and receiving said transparent gel base and said coloring material which are injected from a tip of said charging nozzle by a vessel, said charging nozzle and said vessel having longitudinal axes which are substantially parallel to each other and define a Z-axis;

said charging being performed by rotating said vessel in an XY plane, as well as moving at least one of said vessel and said charging nozzle away from each other along the Z-axis when said transparent gel base and said coloring matering which are injected from said tip of said charging nozzle are received by said vessel;

said tip of said charging nozzle being positioned above the surface of said cosmetic material in the vessel during said charging, whereby said coloring material forms a three-dimensional pattern which is visible inside of said transparent gel base.

4,966,206

DEVICE FOR FILLING A GASEOUS FUEL CONTAINER

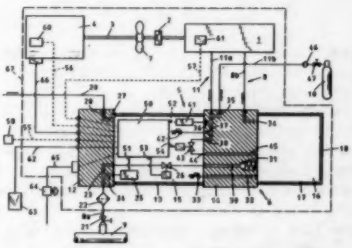
Heinz Baumann; Heinz Mutter, both of Winterthur; Kurt Schreiber, Dietlikon, all of Switzerland, and Peter Thurig, Brampton, Canada, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 22, 1988, Ser. No. 223,284

Claims priority, application Switzerland, Jul. 23, 1987, 02810/87; Feb. 17, 1988, 00582/88

Int. Cl.[5] B65B *31/00*

U.S. Cl. 141—83 **27 Claims**



1. A device for filling a gaseous fuel container, said device comprising

a first casing having an inlet line for receiving a flow of gaseous fuel from a source of gaseous fuel, a first discharge line for supplying a flow of compressed gaseous fuel to a gaseous fuel container and a second discharge line for expelling a flow of compressed gaseous fuel;

a compressor in said casing for compressing a flow of gaseous fuel, said compressor having a suction line for receiving a flow of gaseous fuel from said inlet line and an outlet line for supplying a flow of compressed gaseous fuel to said first discharge line;

an inlet shut-off valve in said inlet line;

a second pressure tight casing within said first casing;

a pressure-limiting valve within said second casing connected to said outlet line of said compressor, said pressure limiting valve being adjustable to a predetermined maximum pressure of the compressed gaseous fuel;

a discharge valve within said second casing connected to said outlet line of said compressor;

a temperature sensor outside said first casing for generating a signal in response to ambient temperature;

a pressure sensor within said second casing connected to said outlet line of said compressor for generating a signal in response to the pressure of the gaseous fuel therein;

a pressure difference sensor within said second casing for generating a signal in response to a difference in pressure between the fuel pressure in said inlet line of said first casing and the pressure inside said second casing; and

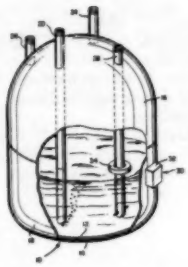
a control device in said second casing connected to each of said sensors to receive each said signal therefrom, said control device being connected to said inlet valve and said discharge valve to control said inlet valve and said discharge valve in dependence on said signals.

4,966,207

DISPOSABLE CHEMICAL CONTAINER

Richard E. Howard, Escondido, and Joseph P. Keene, Oceanside, both of Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 947,913, Dec. 29, 1986, Pat. No. 4,851,821.
This application May 31, 1989, Ser. No. 359,245
Int. Cl.[5] B65B *3/04*
U.S. Cl. 141—98 1 Claim



1. An article for containing liquid chemicals, comprising:

a moisture-impermeable bubbler having an organic polymer interior and a metal exterior;

said bubbler having a fill tube, a thermowell tube and an outlet tube communicating with the interior thereof;

a breakseal in said outlet tube, said breakseal adapted to be ruptured when said outlet tube is connected to a delivery conduit valve thereby preventing contamination of said liquid in said bubbler;

a valve fixed in sealing engagement to said outlet tube on said bubbler and having a metal exterior, and an organic polymer interior that is nonreactive with and noncontaminative of the liquid in said bubbler, said valve having the means to rupture said breakseal;

means disposed around said thermowell to enable a user to determine the level of liquid in said bubbler; and

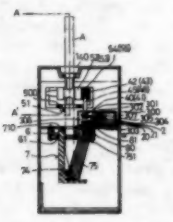
an ultra-high purity liquid chemical inside said bubbler selected from the group consisting of trichloroethane, phosphorus trichloride, trichloroethylene, tetramethoxysilane, phosphorus oxychloride, silicon tetrabromide, arsenic trichloride, phosphorus tribromide, and antimony pentachloride, said organic polymer material being nonreactive with and noncontaminative of said liquid chemical.

4,966,208

PENCIL SHARPENER

Chiou-Luh Uang, Long-Jong Street, Yung-Kang Shiang, Tainan Shien, Taiwan

Filed Jan. 25, 1990, Ser. No. 470,218
Int. Cl.[5] B43L *23/00*
U.S. Cl. 144—28.72 1 Claim



1. A pencil sharpener comprising:

a housing having an open top and a side opening in a lower portion of a side wall thereof;

a partition means dividing the housing into a first compartment thereabove and a second compartment having the side opening therebelow;

a shavings collection means adapted to be removably stored in the second compartment and closing the side opening;

a cover means adapted to be removably closing the open top of the housing;

a feeding means having brackets suspended from the cover means and disposed in the first compartment as the cover means closing the open top of the housing, a pair of rollers respectively and rotatably mounted on the brackets and provided with corresponding circumferential grooves and engaging means;

a gear train for reducing rotation speed from an input gear to an output gear thereof, disposed in the first compartment;

a reversible D.C. motor having an output end engaging the input gear of the gear train and powered by dry cells stored in the housing;

means interengaging the output gear of the gear train and the engaging means of the rollers feeding means in a way that driving the rollers to rotate in reverse directions with respect to each other;

a support means attached under the partition means in the second compartment and sequentially defining a cylindrical space and an internal flange provided with teeth in an inner side wall thereof;

a frame means having a circular member having an outer periphery corresponding to an inner side wall of the support means defining the cylindrical space and rotatably resting on the internal flange, an elongation member attached aside to the circular member and extending downwardly through the support means and retaining a base plate spaced from and under the circular member;

a gear member rigidly mounted on the circular member of the frame member within cylindrical space of the secured support means and defining an opening;

a vertical pencil passage defined by an opening in the cover member, a space between grooved portions of the rollers, an opening in the partition means, the opening defined by the gear member mounted on the circular member and an opening in the circular member all in a vertical alignment;

means rotatably secured in the partition means therethrough and interengaging the input gear of the gear train and the gear member mounted on the circular member for rotating the frame member with respect to the support means;

abrasive means rotatably mounted between the circular member and the base plate of the frame member and having a periphery being at an angle with respect to the vertical pencil passage; and

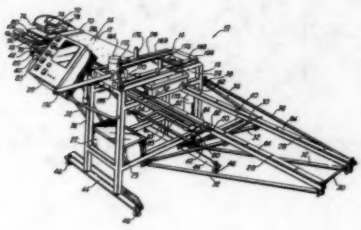
a control circuit having a first switch means with a detector extending into the vertical pencil passage in a position close to and below the rollers and adapted to be actuated either to turn on the motor to drive the rollers to rotate so as to drive a pencil retained therebetween for pointing towards the abrasive means along the vertical pencil passage and the frame member and the abrasive means to point a leading end of the pencil inserted thereby, or to turn off the motor, and a second switch means having a detector extending into the vertical pencil passage at its lowermost position and adapted to be actuated to reverse the rotation direction of the motor so as to drive the rollers to move the pencil retained therebetween away from the abrasive means.

4,966,209

PRECISION MULTI-POINT LINEAR POSITIONING SYSTEM

Robert D. Worley, 2490 Fieldstone Dr., Conyers, Ga. 30208

Filed Dec. 4, 1989, Ser. No. 445,811
Int. Cl.[5] B27C 5/02; B27B 1/00
U.S. Cl. 144—134 A 20 Claims



9. A system for precision linear positioning of material along a frame, comprising:

(a) a carrier means for carrying said material juxtaposed above said frame;

(b) means for linearly moving said carrier means along said guide rod means comprising:

(i) guide rod means attached to said frame along which said carrier means is supported and linearly movable;

(ii) a carrier positioning module securely attached to said carrier means, said carrier positioning module capable of sliding along said guide rods to cause linear movement of said carrier means with respect to said frame, said carrier positioning module supporting said carrier means along said guide rod means;

(iii) at least two pneumatic cylinders each having an extendable and retractable piston, including a first pneumatic cylinder fixed in position relative to said guide rod means and a last pneumatic cylinder fixed in position relative to said carrier positioning module, said cylinders connected to each other in a series, the extension and retraction of any of said pistons cumulatively causing the sliding of said carrier positioning module along said guide rod means;

(iv) a piston mounting plate attached to at least one said piston;

(v) a cylinder mounting plate attached to at least one said cylinder;

(c) stopping means for limiting the extension of each said piston, comprising:

(i) a position set control rod attached to said piston mounting plate;

(ii) a set control apparatus adjustably attached to a position set control rod, said set control apparatus capable of contacting an associated cylinder mounting plate when an associated cylinder has its piston extended, said set control apparatus limiting the further extension of the piston of said associated cylinder upon contacting said associated cylinder mounting plate; and

(d) means for providing a controllable amount of air to each pneumatic cylinder to selectively control the extension and retraction of each said piston.

4,966,210

WALLET WITH DETACHABLE BILLFOLD

John M. Folkertsma, 8653 Conservation Rd., NE., Ada, Mich. 49301

Filed Dec. 27, 1989, Ser. No. 457,519
Int. Cl.[5] A45C 1/06, 11/18, 13/02
U.S. Cl. 150—138 22 Claims

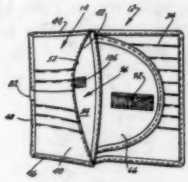
5. A combination wallet and billfold, comprising:

a pair of foldable, generally rectangular wallet members joined together around their peripheries, said wallet members defining an outer surface, an inner surface, and a vertical fold line separating the wallet members into halves;

pocket means on an inner surface of one of said halves for defining a plurality of pockets for cards;

a billfold having inner and outer rectangular billfold members joined along three sides thereof to define an inner surface, an outer surface and an elongated currency pocket having a pair of opposed surfaces, said billfold having a peripheral dimension substantially equal to the peripheral dimension of the other of said halves of said wallet members; and

billfold attachment means on at least one of said wallet members for attaching said billfold to said other of said



halves along an edge of the billfold and within said currency pocket so that the inner surface of said billfold is exposed when the wallet is opened and the currency pocket can be opened without separating the billfold from the wallet members, said billfold attachment means comprising:

a first strap joined to and extending from a side of one of said joined wallet members and towards the fold line; and

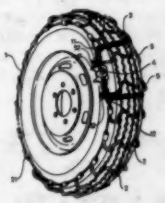
a second strap joined to at least one of said wallet members adjacent said fold line, said billfold defining an opening in a bottom edge thereof, said first strap dimensioned to extend through said opening and into said currency pocket, said second strap dimensioned to extend into said elongated currency pocket of said billfold.

4,966,211

ADJUSTABLE TIRE CHAIN

Lu Tsai-Chuan, 2, Lane 176, Tung-Yi Rd., Chiayi City, Taiwan

Filed May 17, 1989, Ser. No. 352,995
Int. Cl.[5] B60C 27/20, 27/06
U.S. Cl. 152—225 R 3 Claims



1. A tire chain for a tire comprising:

two respective side ropes which are placed around respective side edges of the tire, each said side rope having a rope eye at each end;

a plurality of crosswise bent bars which are connected crosswise and spaced apart between said side ropes;

a metal chain made of a plurality of links which crosses the circumferential surface of the tire twice and which penetrates each of said rope eyes, said metal chain including first and second ends;

a connector which connects a link at said first end of said chain to a link at said second end of said chain; and

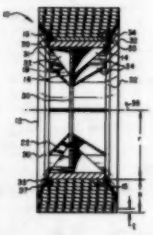
at least one auxiliary crosswise bent bar which is connected crosswise between links of said metal chain located on opposite sides of the tire, said auxiliary bent bar including respective threaded ends which pass through a respective said link and respective bolts which are received on a respective threaded end to prevent withdrawal of said respective threaded end through said respective link.

4,966,212

WHEEL AND SOLID RUBBER TIRE ASSEMBLY AND METHOD

Giles Hill, Highway 70 E., P.O. Box 809, Idabel, Okla. 74745

Filed Aug. 5, 1988, Ser. No. 228,982
Int. Cl.[5] G60D 7/00
U.S. Cl. 152—302 **10 Claims**



1. A wheel and tire assembly with a solid rubber tire, said assembly comprising:

(a) mounting disc means;

(b) a large diameter rim, having a cylindrical surface, rigidly affixed to said mounting disc means and having axially opposed peripherial sides;

(c) cross rib means rigidly fastened to and laterally extending across said cylindrical surfaces;

(d) side support means rigidly affixed to and radially projecting from each peripheral side of said cylindrical surface;

(e) a base layer of even thickness substantially flat rubber cemented to said cylindrical surface interposed between said cross rib means and said side support means; and

(f) multiple additional layers of even thickness substantially flat sheet rubber bonded to said base layer and not interposed between said cross ribs, with each succeeding additional layer of even thickness substantially flat sheet rubber bonded to the preceding layer such that a low profile solid rubber tire is obtained which is bonded directly to said large diameter rim.

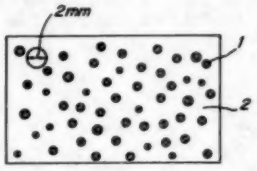
4,966,213

PNEUMATIC TIRES WITH APERTURED PUNCTURE SEALING LAYER

Yasuyoshi Kawaguchi, Higashiyamato; Masayuki Ohashi, Suginami, and Hikaru Tansei, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,105
Claims priority, application Japan, Feb. 16, 1988, 63-31865
Int. Cl.[5] B29C 73/16, 73/22; B32B 3/10, 31/00
U.S. Cl. 152—504 **8 Claims**

1. A pneumatic tire comprising a carcass ply, two vulcanized rubber composition layers arranged radially inside the carcass ply, a continuous self-supportable apertured layer of a sealing material arranged between the two vulcanized rubber composition layers, said sealing material having a viscosity of not more than 6×10^4 poises at 60° C., and bonding portions dis-



continuously bonding said two vulcanized rubber composition layers while passing through the continuous layer.

4,966,214

HIGH INNER PRESSURE HEAVY DUTY PHENUMATIC RADIAL TIRE INCLUDING FOLDED BELT LAYERS

Kuninobu Kadota, Kodaira, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

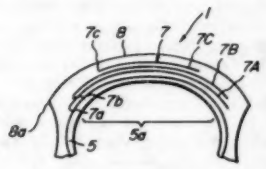
Filed Mar. 1, 1989, Ser. No. 317,499
Claims priority, application Japan, Mar. 1, 1988, 63-45734
Int. Cl.[5] B60C 9/26
U.S. Cl. 152—528 **10 Claims**

1. A high inner pressure heavy duty pneumatic radial tire comprising; a carcass made of a plurality of plies by laminating organic fiber cord layers in a toroidal shape whose cords are arranged in parallel with each other and at cord angles within 70–90° relative to an equatorial plane of the tire, at least one of said plies having turn-up portions which are turned up about a pair of bead cores from inside to outside, and a belt made of exclusively organic fiber cords arranged as a plurality of cord reinforcing layers whose cords are arranged in parallel with each other and at cord angles within 10–70° relative to the equatorial plane, said cord reinforcing layers being laminated with the cords intersecting between the cord reinforcing layers, wherein said belt comprises at least two sets of packing structural reinforcing layers, each of said packing structural reinforcing layers comprising at least one cord reinforcing layer having width-wise edges folded inwardly to form folded layers and at least one further cord reinforcing layer having widths as cut corresponding to inner widths of the folded layers and surrounded by the folded layers to form an even number of inner core reinforcing layers, said inner core reinforcing layer of at least one set of packing structural reinforcing layers adjacent the carcass being higher in circumferential rigidity than the folded layers, and cords of said folded layers and said inner core reinforcing layers being made of materials substantially the same at least in modulus of elasticity.

4,966,215
TIRE PAIR FOR A TWO-WHEELED VEHICLE

Takeshi Oka, Kodaira, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Mar. 15, 1989, Ser. No. 323,904
Claims priority, application Japan, Mar. 18, 1988, 63-66164
Int. Cl.[5] B60C *9/18, 9/28*
U.S. Cl. 152—538 **7 Claims**



1. A pair of tires for a two-wheeled vehicle respectively mounted on front wheel and a rear wheel of the vehicle comprising a front tire and a rear tire, respectively; each of the tires including a carcass layer made of at least one layer of organic fiber cords arranged at angles of 60° to 90° relative to circumferential directions of the tire, and a belt layer made of at least two layers having different widths and arranged radially outwardly of said i carcass layer at its crown zone, said at least two layers having organic fiber cords arranged at angles of 5° to 35° relative to the circumferential directions of the tire, and said cords in adjacent layers intersecting with each other, said front tire having one of said at least two layers of the belt layer arranged on a radially outer side with a width narrower than the other layer arranged on a radially inner side and cord angles of belt layers of said front tire being greater than cord angles of belt layers of said rear tire, and with said rear tire, one of said at least two layers of the belt layer arranged on a radially outer side having a width wider than the other layer arranged on a radially inner side, in said front tire the radially innermost belt layer has a maximum belt width and remaining belt layers become narrower as they are arranged radially outward and in said rear tire the radially innermost belt layer has a minimum belt width and remaining belt layers become wider as arranged radially outward.

4,966,216
HEAVY DUTY RADIAL TIRES WITH METALLIC CARCASS PLY

Kiyohito Kawasaki, Akigawa; Yujiro Umezawa, Tokyo, and Toshio Sugawara, Higashiyamato, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

PCT No. PCT/JP88/00231, § 371 Date Jun. 8, 1988, § 102(e) Date Jun. 8, 1988, PCT Pub. No. WO88/09840, PCT Pub. Date Dec. 15, 1988
PCT Filed Mar. 1, 1988, Ser. No. 245,439
Claims priority, application Japan, Jun. 8, 1987, 62-141598
Int. Cl.[5] B60C *9/16*
U.S. Cl. 152—556 **4 Claims**

1. A heavy duty radial tire comprising at least one carcass ply containing cords arranged substantially at an angle of 90° with respect to the equator of the tire and wound around a bead core from inside toward outside, characterized in that as said carcass ply, metal cords of a single layer construction obtained by twisting 3 to 5 metallic filaments each of 0.13 to 0.32 mm in diameter having an elongation P_1 represented by an arithmetic mean value of 0.35 to 1.0% under a load of 0.25 to 5.0 kgf/cord are arranged so that a distance between cords at an end portion of said carcass ply is not less than 0.25 mm wherein tensile strength TS (kgf/mm^2) of the cords and filament diameter d (mm) of said metallic filament in the heavy duty radial having a load index according to ISO 4209/1 of not less than 100 but no more than 121 which satisfy one of the following relations (1) to (3):

(1) when the number of metallic filaments is 5,

$$TS \geq \frac{37.55(2.89\,d + 0.25)}{\pi \times d^2}$$

(wherein d=0.13 to 0.25)

(2) when the number of metallic filaments is 4,

$$TS \geq \frac{46.94(2.61\,d + 0.25)}{\pi \times d^2}$$

(wherein d=0.14 to 0.25)

(3) when the number of metallic filaments is 3,

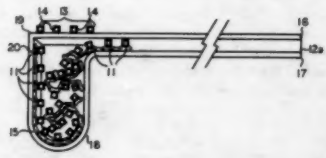
$$TS \geq \frac{62.59(2.33\,d + 0.25)}{\pi \times d^2}$$

(wherein d=0.15 to 0.25)

4,966,217
SAFETY COVER FOR AUTOMOTIVE SERVICE PITS

Scott A. Dechambeau, 2105 Dorothy Ave., Boise, Id. 83706; Robert Torkelson, 542 Tyler Rd., Emmett, Id. 83617, and David Thompson, 2209 Dorothy Ave. #2, Boise, Id. 83706

Filed Feb. 13, 1989, Ser. No. 309,165
Int. Cl.[5] E06B *9/26*
U.S. Cl. 160—35 **24 Claims**



1. A safety cover for an automotive service pit having a pair of side walls defining the longitudinal dimension and a pair of end walls defining the transverse dimension, which comprises:

first and second segments of roller chain each having a length approximately equal to the longitudinal dimension of the automotive service pit and disposed in parallel spaced relationship one to the other;

a plurality of bar members each having a first end perpendicularly attached to said first segment of roller chain and a second end perpendicularly attached to said second segment of roller chain, said bar members further being disposed in parallel spaced relation one to the other and having a length approximately equal to the inside transverse dimension of the automotive service pit;

first and second segments of C-channel each having a length at least as great as the longitudinal dimension of the automotive service pit, said first C-channel segment being attached along the top edge of a first side of said pair of side walls for slidably and frictionally receiving said first roller chain segment, and said second C-channel segment being attached along the top edge of a second side of said pair of side walls for slidably and frictionally receiving said second roller chain segment;

each of said C-channel segments further having upper and lower lips for holding said roller chain with a U-shaped bend in one end of the lower lip forming a receiving

pocket adjacent an end wall of the automotive service pit for receiving said bar members and connected roller chain segments when the cover is in an open position; and

weight responsive brake means for inhibiting sliding of the cover when weight is placed on any one or more of said plurality of bar members.

4,966,218

WINDOW CORNICE AND METHOD FOR HANGING CURTAINS

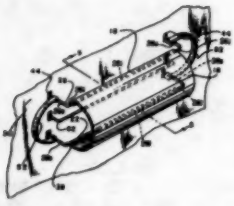
Margaret A. Peters, 1139 Summit Lawn, Wichita, Kans. 67212

Continuation of Ser. No. 173,056, Mar. 25, 1988, Pat. No. 4,865,105. This application Oct. 30, 1989, Ser. No. 428,640

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.[5] E04F *10/00*

U.S. Cl. 160—38 **59 Claims**



1. A window cornice assembly comprising

a front plate member semi-circular in vertical cross-section and having an upper edge and a lower edge; a rod including an intermediate rod section that is slidably secured to said upper edge of said front plate member such that the intermediate rod section extends longitudinally along the upper edge of the front plate member, said rod having at least one off-set side bound to said intermediate section and with an end being adaptable to mount to a wall member; and at least one side plate member slidably secured to said at least one off-set side of said rod.

4,966,219

SLIDING SHUTTER COMPOSED OF ARTICULATED SLATS, PARTICULARLY FOR FURNITURE

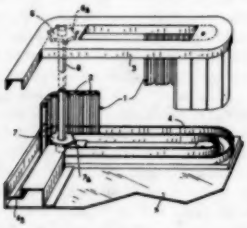
Henri C. Sonolet, Paris, France, assignor to Marcadet Mobilier, Le Blanc Mesnil, France

Continuation of Ser. No. 55,242, May 28, 1987, abandoned. This application Feb. 9, 1990, Ser. No. 477,597

Claims priority, application France, Jun. 17, 1986, 86 08750; Nov. 14, 1986, 86 15883

Int. Cl.[5] E05D *15/06*

U.S. Cl. 160—201 **8 Claims**



1. A sliding shutter for furniture capable of moving longitudinally without jamming or blocking of the shutter slats made of a plurality of vertical articulated slats disposed between two slide guides lying one above the other, each slat comprising a body consisting of a planar rear wall and a front wall having two projecting structures centrally bounding a recessed meshing structure, these two walls joining one another and being laterally extended by articulation structures designed to be articulated to a corresponding structure on the adjoining slat, while an internal bracing structure is provided which is disposed longitudinally along the axis of symmetry of the slat and which in conjunction with the front and rear walls imparts appropriate rigidity to the slat, this internal bracing structure also being intended to support the meshing structure, said slats being driven by at least two pinions carrying teeth with a profile adapted to mesh with a gutter disposed on each side of the vertical axis of symmetry of each slat mounted on a common shaft and meshing with said articulated slats, each pinion provided with internal peripheral ribs to secure a vertical square bar and said slats having at their lateral ends a pivot and a rolled edge adapted to engage the pivot of the adjacent slat.

4,966,220

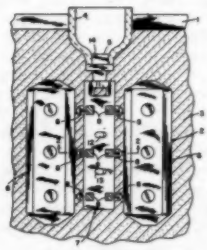
EVAPORABLE FOAM CASTING SYSTEM UTILIZING A HYPEREUTECTIC ALUMINUM-SILICON ALLOY

William G. Hesterberg, Rosendale; Raymond J. Donahue, Fond du Lac, and Terrance M. Cleary, Allenton, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 94,393, Sep. 8, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 340,555

Int. Cl.[5] B22C *9/04*

U.S. Cl. 164—34 **7 Claims**



1. A method of casting, comprising the steps of preparing a molten hypereutectic aluminum silicon alloy containing by weight up to 30% silicon, casting said molten alloy into a mold comprising an evaporable foam pattern surrounded by a finely divided medium, the heat of said molten alloy acting to vaporize said pattern with the vapor passing into and being retained within said medium and said molten alloy filling the void resulting from the vaporization of said pattern, and precipitating primary silicon from said molten alloy as said alloy cools to provide a cast alloy containing precipitated primary silicon, said cast alloy having decreased microporosity and having a more uniform distribution of said primary silicon.

4,966,221

METHOD OF PRODUCING ALUMINUM ALLOY CASTINGS AND PISTON MADE OF ALUMINUM ALLOY

Shunzo Takasugu; Yukihiro Sugimoto; Keiichiro Noguchi, and Motohmi Urabe, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Continuation of Ser. No. 609,876, May 14, 1984, abandoned. This application May 27, 1986, Ser. No. 867,597

Claims priority, application Japan, May 18, 1983, 58-87197; May 25, 1983, 58-92188

Int. Cl.[5] B22D *19/16*

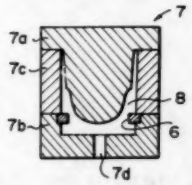
U.S. Cl. 164—120 **9 Claims**

1. A method of producing aluminum alloy piston castings having ring-like ring support portions comprising the steps of

holding a ring-like porous material in a piston die in a position corresponding to the ring support portion of the piston, said porous material being a metal selected from the group consisting of Ni, Cu and Fe, said porous material having a volume fraction in the range of from 3 to 50%;

introducing molten aluminum alloy into the die;

high-pressure squeeze casting said molten aluminum alloy



under an applied pressure of not lower than 400 Kg/cm^2 to form an aluminum casting stock with said porous material therein; and

maintaining the casting stock at 450° to 500° C. for 1 to 10 hours so that an intermetallic compound layer of aluminum and said metal of the porous material is formed on the boundary between the porous material and the aluminum alloy, said intermetallic compound having a hardness of at least 380 HV.

4,966,222

METHOD OF AND APPARATUS FOR PRODUCING SHAPED CASTINGS

Boris E. Paton, ulitsa Chkalova, 41, kv. 26; Boris I. Medovar, ulitsa A.Barbjusa, 22/26, kv. 109; Jury V. Orlovsky, ulitsa Postyaheva, 5, kv. 25; Vitaly V. Lupan, ulitsa Naumova, 19, kv. 153; Vladimir Y. Maidannik, bulvar L.Ukrainki, 19, kv. 266; Grigory B. Schupak, ulitsa Chudnovskogo, 7, kv. 74; Jury Y. Chernyavsky, bulvar L.Ukrainki, 8, kv. 56; Alexei G. Bogachenko, Sapernoe pole, 26a, kv. 30, and Alexandr N. Kozhushko, ulitsa Stalskogo, 16a, kv. 38, all of Kiev, U.S.S.R.

Filed Oct. 5, 1989, Ser. No. 417,737

Int. Cl.[5] B22D *23/00, 41/04*

U.S. Cl. 164—136 **7 Claims**

1. A method of producing shaped casting in a mold, comprising the following steps:

installing a mold and a reservoir iin an initial position, in which their upper end faces are arranged at an angle of 180° to one another;

obtaining molten metal and slag in said reservoir;

rotating said mold 180° about the center point of a common pivot bearing with said reservoir so that said mold is above said reservoir so that their upper end faces adjoin each other and form a joint;

transferring said molten metal and slag into said mold, thus effecting a process of pouring them from said reservoir by simultaneous joint rotating of said mold and reservoir to a position, in which said reservoir is placed above said mold;

sealing tightly said joint of said upper end faces during said process of pouring;

crystallizing said molten metal and slag in said mold until a shaped casting having a casting head is produced.

6. A device for producing shaped castings in a mold comprising:

a reservoir for molten metal and slag and having an upper end face;

drive for rotating said reservoir for molten metal and slag;

a mold having an upper end face and mounted with a possibility of moving toward said reservoir for molten metal and slag until said upper end face of said reservoir adjoins said upper end face of said mold, said upper end faces of said reservoir for molten metal and slag and of said mold forming upon adjoining a closed integrated unit consisting of said reservoir for molten metal and slag and said mold and said integrated unit being rotated in a vertical plane by said drive;

a first pivot bearing and said reservoir for molten metal and slag and said mold mounted on said first pivot bearing;

a drive mounted on said mold for turning said mold in a vertical plane;

a second pivot bearing and said reservoir for molten metal and slag fixed in between said first pivot bearing and said second pivot bearing with a possibility of occupying positions, in one of which it is connected to said first pivot bearing and in a second position it is connected to said second pivot bearing;

at least one additional pivot bearing;

at least one additional mold mounted on said additional pivot bearing and having an upper end face; and

at least one additional drive mounted on said additional mold for turning the additional mold in a vertical plane, said upper end faces of said reservoir for molten metal and slag and said additional mold forming in one position of said reservoir for molten metal and slag a close integrated unit, consisting of said reservoir for molten metal and slag and said additional mold and said integrated unit being rotatable in a vertical plane by means of said drive of said reservoir for molten metal and slag.

4,966,223

METHOD AND APPARATUS FOR FORMING DISK WHEEL LIKE FORMED PARTS

Takeshi Mihara, Ube, Japan, assignor to Ube Industries Ltd., Yamaguchi, Japan

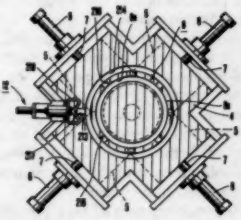
Division of Ser. No. 23,820, Mar. 9, 1987, Pat. No. 4,760,874. This application Jul. 12, 1988, Ser. No. 217,978

Claims priority, application Japan, Apr. 16, 1986, 61-86078; Apr. 16, 1986, 61-86079; Dec. 1, 1986, 61-284219

The portion of the term of this patent subsequent to Aug. 2, 2005, has been disclaimed.

Int. Cl.[5] B22D *17/32*

U.S. Cl. 164—305 **3 Claims**



1. An apparatus for forming molded metal parts in the shape of disk wheels comprising:

(a) a metal mold unit comprising a disk wheel cavity having a mold axis vertical to said mold unit, into which and from

the bottom of which molten metal may be injected in the direction of said mold axis, said cavity including a rim portion and a disk portion;

(b) a degassing unit for the removal of gas from said disk wheel cavity during operation of said apparatus, said degassing unit comprising a discharge passage through which gas can exit said disk wheel cavity, and a discharge value capable of closing said discharge passage in response to the position of said metal within said disk wheel cavity during said operation; and

(c) at least one annular groove arranged concentric to said mold axis, said annular groove positioned adjacent to either said rim portion or said disk portion of said disk wheel cavity, and said annular groove in fluid communication with said disk wheel cavity and said degassing unit.

4,966,224

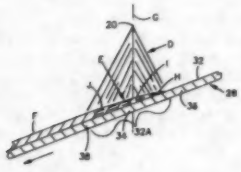
SUBSTRATE ORIENTATION IN A GAS-ATOMIZING SPRAY-DEPOSITING APPARATUS

Harvey P. Cheskis, North Haven; W. Gary Watson, Cheshire, and Ashok Sankaranarayanan, Bethany, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 20, 1988, Ser. No. 246,711

Int. Cl.[5] B22D *11/06*; C23C *4/12*

U.S. Cl. 164—429 **14 Claims**



1. In a molten metal gas-atomizing spray-deposing apparatus, the combination comprising:

(a) means for atomizing a stream of molten metal into metal particles in a devergent spray pattern thereof being of higher temperature at a center region of said pattern than at an outer peripheral region thereof;

(b) means movable along a path and having an area thereon disposed below said atomizing means for receiving a deposit of said particles in said spray pattern to form a product on said movable means;

(c) said deposit-receiving area of said movable means having consecutively arranged upstream, intermediate and downstream portions upon which respective bottom, intermediate and upper cross-sectional portions of the deposit are layered one upon the next to form the product; the bottom deposit portion being disposed closest to, and the upper deposit portion farthest from said deposit-receiving area of said movable means and the intermediate deposit portion being disposed in between;

(d) said deposit-receiving area of said movable means being oriented relative to, and displaced from, said divergent spray pattern of said atomizing means such that particles in said spray pattern travel through at least as great a distance to reach said intermediate portion of said area as particles in said spray pattern travel to reach said upstream portion thereof; and

(e) means for removing said deposited product from said movable means.

4,966,225

CERAMIC SHELL MOLD FOR INVESTMENT CASTING AND METHOD OF MAKING THE SAME

Paul R. Johnson, Whitehall, and Eliot S. Lassow, North Muskegon, both of Mich., assignors to Howmet Corporation, Greenwich, Conn.

Continuation of Ser. No. 205,731, Jun. 13, 1988, abandoned. This application Apr. 20, 1990, Ser. No. 512,502

Int. Cl.[5] B22C *1/00, 9/04*

U.S. Cl. 164—519 **19 Claims**

1. A method for forming a ceramic shell mold for investment casting high point metals and alloys, said method comprising the steps of:

providing a pattern having the shape of a desired casting;

forming a facecoat layer by dipping said pattern into a first slurry comprised of a first ceramic material;

forming a first layer overlaying said facecoat layer by dipping the coated pattern into a second slurry comprised of a second ceramic material;

forming at least one intermediate layer overlapping said first layer by dipping the coated pattern into a ceramic slurry selected from the group consisting of said second slurry and a third slurry comprised of a third ceramic material, said third ceramic material having a composition different from said second ceramic material, at least one of said at least one intermediate layer being formed by dipping the coated pattern into said third slurry, said third ceramic material having different thermophysical properties than said second ceramic material such that said ceramic shell mold has a greater high temperature creep resistance than a shell mold formed solely from said second ceramic material or solely from said third ceramic material; and

forming a layer overlaying said at least one intermediate layer by dipping the coated pattern into said second slurry.

13. A ceramic shell mold for investment casting high melting point metals and alloys, said ceramic shell mold comprising:

a facecoat layer comprised of a first ceramic material,

a first layer overlaying said facecoat layer comprised of a second ceramic material,

at least one intermediate layer overlaying said first layer comprised of a material selected from the group consisting of said second ceramic material and a third ceramic material, said third ceramic material having a composition different from said second ceramic material, at least one of said at least one intermediate layer being comprised of said third ceramic material, said third ceramic material, having different thermophysical properties than said second ceramic material such that said ceramic shell mold has a greater high temperature creep resistance than a shell mold formed solely from said second ceramic material or solely from said third ceramic material; and

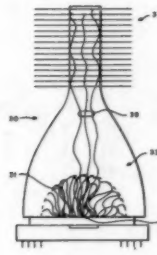
a layer overlaying said at least one intermediate layer comprised of said second ceramic material.

4,966,226

COMPOSITE GRAPHITE HEAT PIPE APPARATUS AND METHOD

William R. Hamburgen, Menlo Park, Calif., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Dec. 29, 1989, Ser. No. 458,592
Int. Cl.[5] F28D *15/02*
U.S. Cl. 165—104.26 **17 Claims**



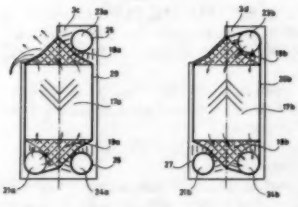
1. A heatpipe apparatus, comprising:
a reservoir member having an attachment surface; and
evaporator means coupled to said attachment surface and having a configuration which approximates a hemisphere for conducting heat away from said attachment surface.

4,966,227

PLATE EVAPORATOR

Jarl Andersson, Lund, Sweden, assignor to Alfa-Laval Thermal AB, Lund, Sweden

PCT No. PCT/SE89/00263, § 371 Date Dec. 6, 1989, § 102(e) Date Dec. 6, 1989, PCT Pub. No. WO89/11627, PCT Pub. Date Nov. 30, 1989
PCT Filed May 12, 1989, Ser. No. 438,434
Claims priority, application Sweden, May 25, 1988, 8801946; May 26, 1988, 8801961
Int. Cl.[5] F28F *3/10, 3/08*
U.S. Cl. 165—167 **6 Claims**



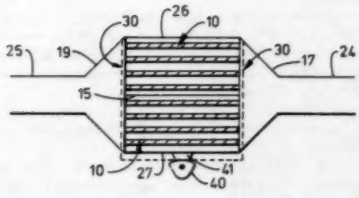
1. Plate heat exchanger comprising
a package of heat exchange plates, each of which is elongated and substantially rectangular and has a central heat exchange portion and corner portions provided with ports,
an inlet member (7) connected both to a source (9) of liquid to be at least partly evaporated in the plate heat exchanger and to a first channel extending through the package of heat exchange plates, which channel is formed by aligned ports in the heat exchange plates,
inlet and outlet members (5, 11) connected both to a source (13) and a reception place (15), respectively, for a heating medium and to two other channels extending through the package of heat exchange plates, which channels are formed by aligned ports in the heat exchange plates on both sides of the central heat exchange portions of the heat exchange plates, said first channel communicating with only every second interspace between the heat exchange plates, whereas the other two channels communicate with the other interspaces between the heat exchange plates, and
sealing means arranged between adjacent heat exchange plates in a way such that said liquid and heating medium during operation of the heat exchanger are allowed to flow substantially in parallel through the plate interspaces in the longitudinal direction of the heat exchange plates either concurrently or countercurrently,
characterized in that
at least every second one of the heat exchange plates (3c–3*f*) is without a corner portion, in which a port of the same kind as anyone of the other ports could have been situated, and
said sealing means leaves outlet openings (16) from the plate interspaces, which communicate with said first channel, in those areas of the heat exchange plates (3c–3*f*) where at least every second one thereof is without a corner portion.

4,966,228

REGENERATIVE GAS-TO-GAS HEAT EXCHANGER

Sherwood L. Fawcett, Columbus, Ohio, assignor to Sedum Corporation, Columbus, Ohio

Filed Feb. 16, 1989, Ser. No. 311,693
Int. Cl.[5] F28D *17/02*
U.S. Cl. 165—4 **16 Claims**



1. A regenerative gas-to-gas heat exchanger comprising:
(A) a plurality of superposed spaced, parallel, four-sided beds of confined metal particles, each of said beds having a thickness permitting gas flow therethrough without substantial pressure drop, said metal particles having a high surface area to bulk volume ratio, a capability of attaining substantially instantaneous temperature equilibrium at any point within a bed and only slight heat conductivity through a bed, an imperforate partition parallel to said beds and separating one half of said beds from another half, thereby preventing gas flow between said one half and said other half;
(B) four gas plenums surrounding said beds, each plenum communicating with one side only of all said beds;
(C) means for continuously supplying a relatively hot gas to one of said plenums, means for continuously supplying a relatively cold gas to another of said plenums opposite from said one plenum, each of the remaining plenums communicating with a separate outlet; and
(D) sliding gate valve means in each said plenum adjacent one side of said beds and configured to communicate with spaces between said beds, means for moving said gate valve means in unison to a first position which directs gas flow through said one plenum across and through said one half of said beds and out of one of said remaining plenums into one of said outlets and which directs gas flow through said opposite plenum across and through said other half of said beds and out of the other of said remaining plenums into the other of said outlets for a predetermined period of time, and to a second position which reverses said gas flows through said beds for said predetermined period of time, whereby said one half of said beds alternately first

extracts heat from said gas flow and then releases heat thereto, while said other half of said beds alternately first releases heat to said gas flow and then extracts heat therefrom, except during movement of said gate valve means between said first and second positions.

4,966,229

LEADING EDGE HEAT PIPE ARRANGEMENT

Donald R. Senterfitt, Jupiter; James R. Mullaly, Palm Beach Gardens; Larry D. Hamner, Palm Beach Gardens; Abdus S. Khan, Palm Beach Gardens, all of Fla., and John G. Smeggil, Simsbury, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 26, 1989, Ser. No. 457,064

Int. Cl.[5] F28D *15/02*; B64C *1/38*; B64D *37/34*

U.S. Cl. 165—41 **11 Claims**

1. In hypersonic engine driven aircraft;

a leading edge cooling apparatus comprising:

an acute angle diamond shaped heat pipe having a containment material thickness, and containing a vaporizable medium;

said heat pipe having an acute angle leading wedge shape form having sides at an included angle between 4 degrees and 10 degrees, and a radius joining the two sides between 2 and 20 times the thickness of the containment material at the radius location;

said heat pipe having an acute angle trailing wedge shape having sides at an included angle between 4 degrees and 10 degrees;

outwardly extending heat exchanger surface longitudinally extending along the containment material of said trailing wedge shape;

a fuel supply means for the engine; and

confinement means for passing fuel from said fuel supply means in heat exchange relationship with said heat exchange surface.

4,966,230

SERPENTINE FIN, ROUND TUBE HEAT EXCHANGER

Gregory G. Hughes, Milwaukee, and Scott Larrabee, Racine, both of Wis., assignors to Modine Manufacturing Co., Racine, Wis.

Filed Jan. 13, 1989, Ser. No. 296,603

Int. Cl.[5] F28D *1/047*

U.S. Cl. 165—150 **16 Claims**

1. A heat exchanger comprising:

first and second spaced parallel headers:

a plurality of substantially identical serpentine conduits having at least three generally parallel runs and terminating in opposed ends, said conduits being in generally spaced, side by side relation, one end of each conduit extending to and being in fluid communication with said first header and the other end of each of conduit extending to and being in fluid communication with said second header; and

a plurality of serpentine fin sheets, each sheet extending between an associated pair of said conduits and in thermally conductive relation therewith;

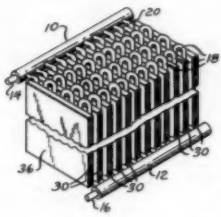
said serpentine conduits being generally planar, and planar sheets sandwiching each of said conduits, said serpentine if sheets being bonded to the adjacent planar sheet on the associated conduit pair.

10. A heat exchanger comprising:

first and second spaced parallel headers;

a plurality of planar serpentine conduits each having at least three generally parallel runs and terminating in opposed ends, said conduits being in generally spaced, side by side relation, one end of each conduit extending to and being in fluid communication with said first header and the other end of each of tube extending to and being in fluid communication said second header;

a plurality of serpentine fin sheets, each sheet extending between as associated pair of said conduits; and



additional sheets sandwiching and bonded to each of said fin sheets and bonded to each said associated pair of said conduits on a side of each conduit thereof so that said conduits are in turn sandwiched by said additional sheets bonded thereto, and so that a said additional sheet is interposed between each said conduit and the adjacent if sheet.

4,966,231

HEAT EXCHANGER CONSTRUCTION

Bryan L. Belcher, Leamington Spa, and Michael P. Daniels, Derby, both of England, assignors to Rolls-Royce plc, London, England

Filed Feb. 16, 1990, Ser. No. 480,923

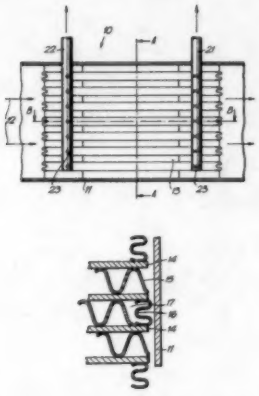
Claims priority, application United Kingdom, Mar. 15, 1989, 8905979

Int. Cl.[5] F28F *3/06*

U.S. Cl. 165—166 **4 Claims**

1. A heat exchanger comprising a casing and a matrix,, said matrix being enclosed within said casing, said matrix comprising a stack of primary plates; spacer means constituted by sheets of corrugated material, said corrugated material being so disposed that the peaks of the corrugations thereof engage and are attached to said primary plates; and corrugated enclosing members, the planes of the peaks of the corrugations in said enclosing members extending in directions which are generally normal to said primary plates; each of said plates being held in spaced apart relationship from adjacent plates by said spacer means so that alternate flow paths for first and second heat exchange fluids respectively are defined by said plates, the peripheries of at least alternate pairs of adjacent plates being interconnected by said enclosing members so that the flow paths for the first of said heat exchange fluids are not in flow communication with the flow paths for the second of said heat exchange fluids, fluid delivery and exhaust means being respectively provided for each of said first and second fluids to direct said fluids into their respective flow paths within said matrix

and exhaust said fluids from those flow paths, said second heat exchange fluid operationally flowing through said casing, said



matrix being so arranged that said second heat exchange fluid flows through the appropriate flow paths in said matrix on its passage through said casing.

4,966,232

APPARATUS FOR COOLING THE CONTENTS OF A VESSSEL

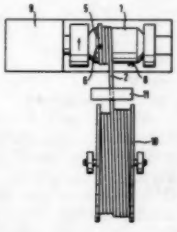
Matthias Aschberger; Karlheinz Färber, both of Giengen, and Anton Deininger, Bachhagel, all of Fed. Rep. of Germany, assignors to The Coca-Cola Co., Atlanta, Ga. and Bosch-Siemens Hausgerate GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 22, 1985, Ser. No. 768,439

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430918

Int. Cl.[5] F28F *3/12*; B67D *5/62*

U.S. Cl. 165—169 **9 Claims**



1. An apparatus for cooling contents of a vessel comprising:

a vessel;

a pipe having a first and second end coiled about said vessel through which a fluid is circulated for cooling said pipe and the contents of said vessel; and

pipe fastening means for substantially securing said first and second ends of said pipe to said vessel from relative movement therebetween, said pipe fastening means maintaining a substantial tension forst along the length of said pipe within the elastic limits of the pipe material for holding said pipe in close intimate contact with said vessel for efficient energy transfer between said contents within said vessel and said fluid circulating within said pipe.

9. A method of making an apparatus for cooling contents of a vessel, said method including the steps of:

(a) securely clamping one end of a pipe through which a cooling fluid can circulate around the vessel;

(b) winding said pipe around said vessel maintaining a substantial tension along the length of said pipe within the elastic limits of the pipe material and throughout the winding step; and

(c) securely clamping the other end of said pipe, while the pipe is still under substantial tension, to said vessel.

4,966,233

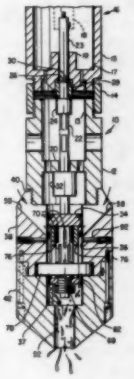
TRACER DEPLOYMENT TOOLS

Curtis G. Blount, Wasilla, and Frank E. Bergren, III, Anchorage, both of Ak., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 19, 1989, Ser. No. 409,178

Int. Cl.[5] E21B *49/00*

U.S. Cl. 166—250 **22 Claims**



1. A tool for discharging a quantity of tracer material into a wellbore, said tool comprising:

body means including a body member defining a generally cylindrical bore;

an actuating device connected to said body means;

a piston disposed in said bore and connected to said actuating device for movement from a first position to a second position, said piston forming a first closure member at substantially one end of said bore;

a member connected to said piston and disposed in said bore for supporting a container of tracer material in said bore;

passage means formed in said body member and operable to communicate said bore with the exterior of said tool in response to movement of said piston from said first position to said second position;

a head part closing an opposite end of said bore in said first position of said piston and movable with said piston to open said opposite end of said bore to the exterior of said tool whereby in response to movement of said piston from said first position to said second position, said bore is opened to provide for the through-flow of wellbore fluid through said bore; and

means cooperable with said member connected to said piston and operable in response to movement of said piston for rupturing said container to discharge tracer material into said bore and out of said tool with wellbore fluid flow through said bore between said one end and said opposite end.

4,966,234

METHOD FOR DETERMINING THE FREE POINT OF A STUCK DRILLSTRING

Ronald G. Whitten, Berlin, Conn., assignor to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Nov. 13, 1989, Ser. No. 436,496
Int. Cl.[5] E21B *47/00, 31/00*
U.S. Cl. 166—250 6 Claims

1. A method for determining the free point of a drillstring that has become stuck in a borehole, said borehole extending substantially downwardly through a formation from a top end to a bottom end, said drillstring comprising a plurality of elements extending along the borehole from a top end of the drillstring at the top end of the borehole through the free point to a bit at the bottom end of the borehole, wherein the elements of the drillstring below the free point are stuck and the elements of the drillstring above the free point are free, comprising:

(a) slacking off on the drillstring;

(b) determining an observed hookload value for the drillstring during slackoff;

(c) estimating an estimated free point position;

(d) calculating a calculated hookload assuming a truncated drillstring, wherein the truncated drillstring comprises the drillstring elements between the top end of the drillstring and the estimated free point position;

(e) comparing the calculated hookload to the observed hookload;

(f) repeating steps c, d and e until the calculated hookload agrees with the measured hookload within a predetermined tolerance;

wherein the free point is found to correspond to a particular estimated free point if the calculated hookload based on a truncated drillstring extending between the top end of the drillstring and the particular estimated free point agrees with the observed hookload within the predetermined tolerance.

4,966,235

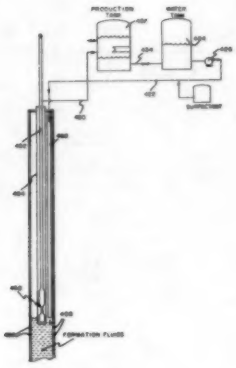
IN SITU APPLICATION OF HIGH TEMPERATURE RESISTANT SURFACTANTS TO PRODUCE WATER CONTINUOUS EMULSIONS FOR IMPROVED CRUDE RECOVERY

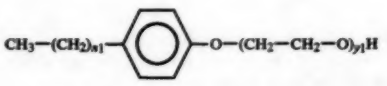
Armand A. Gregoli, Tulsa, Okla.; Andrew M. Olah, Spencer, Ohio; John A. Hamshar, Owasso, and Daniel P. Rimmer, Broken Arrow, both of Okla., assignors to Canadian Occidental Petroleum Ltd., Calgary, Canada

Continuation-in-part of Ser. No. 218,840, Jul. 14, 1988, which is a continuation-in-part of Ser. No. 114,204, Oct. 27, 1987, which is a continuation-in-part of Ser. No. 934,683, Nov. 24, 1986, Pat. No. 4,725,287. This application Jan. 31, 1989, Ser. No. 304,798
Int. Cl.[5] E21B *43/22, 43/24, 43/34*
U.S. Cl. 166—267 45 Claims

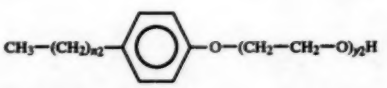
1. A process for recovering oil from a subterranean hydrocarbon-bearing reservoir having a hydrocarbon and penetrated by a wellbore, said process comprising the steps of:

(a) injecting through said wellbore and into said subterranean hydrocarbon-bearing reservoir having a hydrocarbon an emulsifying composition comprising an aqueous phase and a minor amount of an emulsifying agent such that the emulsifying composition contacts at least a portion of the hydrocarbon to form an oil-in-aqueous phase emulsion within said subterranean hydrocarbon-bearing reservoir; and wherein said emulsifying agent comprises a first agent having at least one first ethoxylated alkylphenol compound and a second agent having at least one second ethoxylated alkylphenol compound, said at least one first ethoxylated alkylphenol compound having a first general formula:





wherein n_1 is an integer having a value of from about 7 to about 11, and y_1 is an integer having a value of from about 4 to about 200; and said at least one first ethoxylated alkylphenol compound has a molecular weight distribution with a dispersity of from about 1.0 to about 5.0 and with a weight average molecular weight of from about 558 to about 1582; and wherein at least about 50% by weight of said first agent comprises said at least one first ethoxylated alkylphenol compound having a molecular weight of from about 558 to about 1582; and said at least one second ethoxylated alkylphenol compound having a second general formula



wherein n_2 is an integer having a value of from about 9 to about 14, and y_2 is an integer having a value of from about 4 to about 300; and said at least one second ethoxylated alkylphenol compound has a molecular weight distribution with a dispersity of from about 1.0 to about 5.0 and with a weight average molecular weight of from about 2434 to about 4264, and wherein at least about 50% by weight of said second agent comprises said at least one second ethoxylated alkylphenol compound having a molecular weight of from about 2434 to about 4264;

(b) producing the formed oil-in-aqueous phase emulsion of step (a); and

(c) recovering oil from the produced oil-in-aqueous phase emulsion of step (b).

4,966,236

CEMENTING METHOD AND ARRANGEMENT

Britt O. Braddick, Houston, Tex., assignor to Texas Iron Works, Inc., Houston, Tex.

Continuation of Ser. No. 147,701, Dec. 4, 1987, abandoned. This application May 9, 1989, Ser. No. 348,221
Int. Cl.[5] E21B *33/16*
U.S. Cl. 166—291 91 Claims

1. Apparatus for cementing a liner in a well bore casing wherein cement enters the liner through an operating string

with a bore therethrough and flows through the liner to the cementing region, comprising:

lower and upper spaced plug means for wiping the operating string bore ahead of and behind, respectively, the cement;

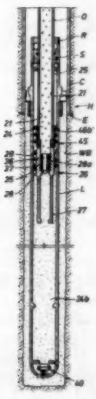
lower and upper spaced wiper means for wiping the liner ahead and behind, respectively, the cement upon engagement, respectively, with said lower and upper spaced plug means for movement through the liner; and

means for releasably securing said lower wiper means to the operating string which extends through the longitudinal bore of said upper wiper means to terminate, respectively, adjacent the lower and upper ends of said upper and lower wiper means and in overlapping relation with said lower wiper means for releasably securing with said lower wiper means below the smallest internal diameter of said upper wiper means.

4. Apparatus for cementing a liner in a well bore casing wherein cement enters the liner through an operating string and flows through the liner to the cementing region, comprising:

lower and upper spaced plug means for wiping the operating string ahead of and behind, respectively, the cement;

lower and upper spaced wiper means for wiping the liner ahead of and behind, respectively, the cement upon engagement, respectively, with said lower and upper spaced plug means for movement through the liner;



said upper wiper means having circumferentially spaced openings through which the operating string extends longitudinally; and

means for releasably securing said upper and lower wiper means to the operating string.

74. A method of cementing a liner that is sealably and releasably supported on an operating string in a well bore having casing comprising the steps of:

releasably securing upper and lower wiper means to the operating string which extends through circumferential openings in the upper wiper means and terminates in overlapping relation with the lower wiper means;

lowering the operating string with the wiper means thereon in the well bore;

selectively rotating and/or reciprocating the liner in the well bore;

releasing the liner from the operating string and suspending the liner on the casing in the well bore;

discharging lower plug means into the operating string to wipe the operating string with cement therebehind;

seating and locking the lower plug means in the lower wiper means and releasing the lower wiper means with the lower plug means therein from the overlapped operating string for wiping ahead of the cement;

discharging upper plug means into the operating string to wipe the operating string behind the cement;

seating the upper plug means on the upper wiper means and releasing the upper wiper means with the plug means thereon from the operating string extending through the upper wiper means for wiping behind the cement;

moving the lower wiper and plug means through the liner to wipe ahead of the cement;

moving the upper wiper and plug means through the liner to wipe behind the cement;

discharging the cement from the liner into the well bore; and

selectively rotating the liner during and/or after the cementing.

4,966,237

METHOD OF EFFECTING EXPANDING CHEMICAL ANCHOR/SEALS FOR ROCK CAVITIES

David E. Swanson, West St. Paul, and Michael X. Schlumpberger, Eagan, both of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jul. 20, 1989, Ser. No. 383,111

Int. Cl.[5] **E21B** *33/138, 43/26;* **E02D** *3/12*

U.S. Cl. 166—292 **10 Claims**

1. A method of sealing a cavity such as a bore hole, well, or fissure against passage of fluids without fracturing walls of said cavity comprising:

placing in said cavity, a wadding material capable of confining the flow of a supply of hardenable and volume expandable chemical grout which occupies a given volume in its initial unhardened and unexpanded condition, and an increased volume relative to said given volume in its hardened condition to exert an expansive force against confining surfaces; and

adding into said cavity and against said material capable of confining the flow, a hardenable and volume expandable non-explosive demolition chemical grout material adapted to exert pressure and effect an expanded seal upon curing between confining surfaces of the cavity and said wadding material capable of confining the flow.

4,966,238

HEXAGON TURF PLUGGER

Robert L. Shields, P.O. Box 164, Miltona, Minn. 56354

Continuation-in-part of Ser. No. 171,304, Mar. 21, 1989, Pat. No. Des. 306,814. This application Aug. 4, 1989, Ser. No. 388,952

Int. Cl.[5] A01B *1/24, 45/04*

U.S. Cl. 172—19 29 Claims

25. A turf plug making tool comprising: a base, upright leg means attached to the base, handle means connected to the leg means, a hexagon shaped blade means attached to the base, said blade means surrounding an opening whereby when a downward force is applied to the handle means to move the blade means into an area of turf a hexagon shaped turf plug is cut and located in said opening, plug retaining means secured to the blade means operable to retain a plug within the opening of the blade means, and upright plug holding means attached to the blade means whereby when the blade means is used to cut successive plugs the plug retaining means, plug holding means and leg means cooperate to hold a plurality of turf plugs in a stacked relation.

4,966,239

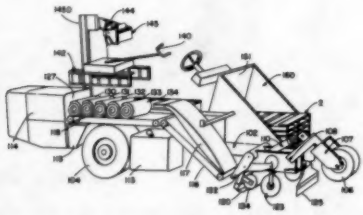
SOD HARVESTING APPARATUS

Marion E. Hutchison, Waterloo, Iowa, assignor to Tiger Industries, Inc., Waterloo, Iowa

Filed Jul. 14, 1989, Ser. No. 380,627

Int. Cl.[5] B62D *1/26;* A01B *45/04*

U.S. Cl. 172—20 17 Claims



13. In sod harvesting apparatus of the type including cutting means for harvesting strips of sod from a field, wherein removal of a strip of sod from said field by said apparatus leaves a vertical surface between uncut sod and ground level where sod has been removed, the improvement which comprises an automatic steering system comprising:

(a) a pivotally mounted sensing arm adapted to sense the location of said vertical surface;

(b) cam means adjacent said sensing arm, said cam means being adapted to periodically urge said sensing arm away from said vertical surface; and

(c) steering means controlled by said sensing arm for steering said harvesting apparatus.

4,966,240

COMBINATION BACKHOE VEHICLE AND BULLDOZER APPARATUS

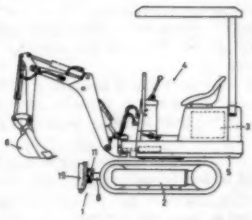
Norihiro Aikawa, Sakai, Japan, assignor to Kubota, Ltd., Osaka, Japan

Filed Nov. 23, 1988, Ser. No. 274,572

Claims priority, application Japan, Dec. 16, 1987, 62-191841[U]; May 27, 1988, 63-70815[U]

Int. Cl.[5] E02F *3/77*

U.S. Cl. 172—825 3 Claims



1. A combination backhoe and bulldozer apparatus for a working vehicle comprising;

a vehicle body (2),

a swivel deck (5) pivotably mounted on said vehicle body (2),

a backhoe implement operatively attached to said swivel body,

a bulldozer apparatus mounted on said vehicle body (2),

said bulldozer apparatus including

a vertically pivotable arm assembly (8),

a blade (10) pivotable on a fore and aft axis (P) and supported on said arm assembly (8) along a center line of the vehicle body,

a pair of hydraulic cylinders (11, 11) disposed at opposite sides of said fore and aft axis (P) and connected to said blade and to said arm assembly for causing pivotal movement of said blade (10) such that said blade (10) is pivotable in opposite directions with extensions of said hydraulic cylinders (11, 11), said cylinders (11, 11) have main cylinder bodies thereof connected to upper positions of said arm assembly (8) and piston rods thereof connected to lower positions of said blade (10) and said cylinders extend parallel with said blade,

a pair of engaging support means (14, 14) extending substantially longitudinally of the vehicle at opposite positions across said fore and aft axis (P), and interconnecting said blade (10) and said arm assembly (8) for relative pivotal movement, said blade (10) being pivotable about said fore and aft axis (P) by means of a pivot pin (9) provided on said arm assembly (8), said engaging support means (14) includes a pair of blade-side engaging members (13) connected to said blade (10) and an arm assembly-side engaging member (12) connected to said arm assembly (8), said arm assembly-side engaging member (12) having an inverse letter L-shaped configuration with a horizontal portion thereof projecting upwardly and forwardly, said main cylinder bodies being connected to upper positions of said horizontal portion, and with perpendicular positions having forwardly and rearwardly facing working surfaces (12*a*), (12*b*) which are contactable with forwardly and rearwardly facing working surfaces (13*a*), (13*b*) of said blade-side engaging member (13), respectively,

said pair of engaging supports means (14, 14) being constructed to permit said blade (10) to pivot about said fore and aft axis (P) within a predetermined range and to move longitudinally of said vehicle body toward and away from said arm assembly (8) within a predetermined range, and

said bulldozer apparatus is operable to function as an outrigger during an earth excavation operation by said backhoe.

4,966,241

VESSEL HOLDING DEVICE FOR PRECISION BALANCES AND ANALYTICAL BALANCES

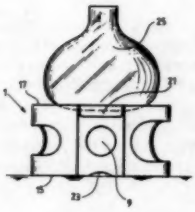
Paul Lüchinger, Uster, and Eduard Fringeli, Bubikon, both, Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland

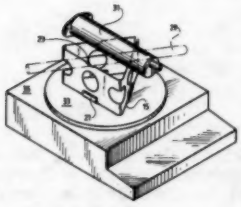
Filed Oct. 12, 1989, Ser. No. 420,340

Claims priority, application Switzerland, Nov. 29, 1988, 4430/88

Int. Cl.[5] G01G *21/22*; A47B *73/00*; A47G *23/02*

U.S. Cl. 177—253 **14 Claims**





1. A device for holding vessels in precision balances, the device comprising at least three side wall members which are arranged at an angle relative to each other and vessel receiving means provided on the side wall members, wherein the at least three side wall members are arranged in a triangle, the side wall members being rectangular and each side wall member having narrow sides, the three side wall members being connected at least at two narrow sides.

4,966,242

ALL-TERRAIN VEHICLE

Bernard Baillargeon, Victoriaville, Canada, assignor to Les Entreprises Bernard Baillargeon Inc., Victoriaville, Canada

Filed Aug. 22, 1988, Ser. No. 234,573

Int. Cl.[5] B62D *11/20*

U.S. Cl. 180—9.44 **15 Claims**

1. An all-terrain vehicle comprising:

a front vehicle body including a generally flat body frame having a longitudinal axis;

a rear vehicle body including a generally flat body frame having a longitudinal axis;

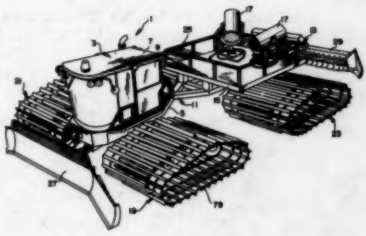
an articulated joint connecting said body frames together for allowing relative lateral oscillation of said frames about a roll axis parallel to the longitudinal axis of one of said body frames, said roll axis being located above both of said frames;

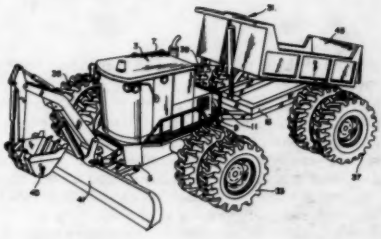
said joint further allowing pivotal movement of said frames about a steer axis perpendicular to said roll axis;

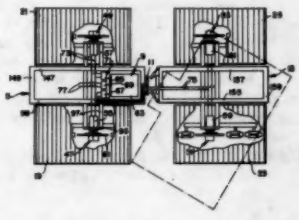
said articulated joint comprising;

(1) a first articulation member and means mounting said first member on one of said body frames for relative oscillation of said first member and of said one of said body frames about said roll axis;

(2) a second articulation member solid with the other of said body frames; and







(3) means joining said two articulation members together, said means being constructed to allow said relative oscillation and said pivotal movement of said body frames;

four motor assemblies each including a pressure-fluid operated motor having an output shaft;

means mounting two of said motor assemblies on said front body frame with the output shafts thereof being coaxial and extending laterally outwardly of said front body frame;

means mounting the remaining two motor assemblies on said rear body frame with the output shafts thereof

being coaxial and extending laterally outwardly of said rear body frame;

pressure fluid generating means on one of said body frames, said generating means including fluid piping operatively connected to said motors to supply pressure fluid thereto for rotating said shafts; wherein a portion of said piping extends between said body frames and is flexible for easing said relative lateral oscillation and said pivotal movement of said body frames; and

four ground-engageable traction means, each connected to one of said output shafts for propelling said vehicle over the ground.

4,966,243

POWER TAKE-OFF ARRANGEMENT

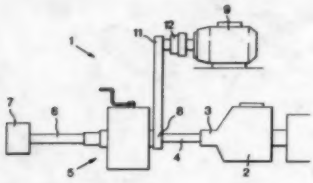
Hovsep J. Mirzakanien, 7 Adina Street, Seven Hills, NSW 2147, Australia

Filed Oct. 17, 1988, Ser. No. 258,851

Claims priority, application Australia, Oct. 15, 1987, PI4904

Int. Cl.[5] B60K *17/28*

U.S. Cl. 180—53.1 **3 Claims**



1. A motor vehicle power take-off arrangement comprising:

a power take-off housing,

a power inlet shaft having power imparted thereto by a prime mover of the motor vehicle and a power outlet shaft drivingly connected to a differential of said motor vehicle, said power inlet shaft and said power outlet shaft coaxially extending into said power housing and having their free ends spaced apart from each other, said free ends having identical, externally-splined portions,

a drive connector means disposed within said power take-off housing, said drive connection means comprising an axially slidable collet having mounted therein a rotatable co-acting internally-splined sleeve, said collet being able to be selectively actuated by an operator so that, in a first position in which said collet bridges, and meshes with, both the said externally-splined end portions, said input and output shafts are drivingly connected and, in a second position in which said collect meshes only with one externally-splined end portion, said input and output shafts are disconnected, one from the other;

and means for transmitting power from said power input shaft to thereby drive auxiliary equipment.

4,966,244

VEHICLE HAVING PLURAL AXLES AND DRIVE SYSTEM THEREFOR

Michael Somerton-Rayner, Nr. Andover, Great Britain, assignor to Esarco Limited, Great Britain

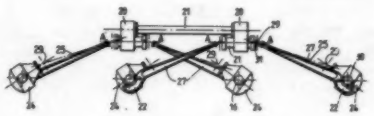
Continuation of Ser. No. 150,214, Jan. 29, 1988, abandoned. This application Jan. 24, 1989, Ser. No. 300,715

Claims priority, application United Kingdom, Jan. 30, 1987, 8702084

Int. Cl.[5] B60K *17/342*

U.S. Cl. 180—24.09 **12 Claims**

1. An all-terrain vehicle comprising a chassis with a load platform or body and a single engine mounted thereon, a series of longitudinally-spaced axles with pairs of ground wheels thereon, suspension means coupling said axles to said chassis and enabling each axle to perform substantial vertical movement relative to the chassis, a respective differential gear axle drive unit for each axle, two transfer boxes both driven by said single engine, each transfer box having two driving outputs, and inclined propeller shafts provided one for each axle whereby each differential axle drive unit is connected to be driven by a respective one of said transfer box driving outputs, each propeller shaft having first coupling means coupling a first end of said shaft to the respective transfer box driving



output and second coupling means coupling a second end of said shaft to the respective differential axle drive unit, each said first and second coupling means including a respective universal joint constituted by an assembly of interconnected yokes, wherein said yoke assembly of said first coupling means is set to be rotationally out of phase with the yoke assembly of said second coupling means, lagging the yoke assembly of said first coupling means by approximately 11° of rotation.

4,966,245

MOTOR VEHICLE HAVING A COVERING PART

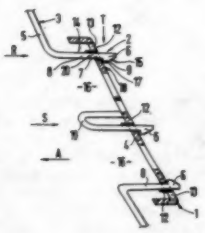
Klaus Pfister, Wiernsheim, Fed. Rep. of Germany, assignor to Dr. Ing. H.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,237

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1988, 3812347

Int. Cl.[5] B60K *11/08*

U.S. Cl. 180—68.6 **9 Claims**



1. A motor vehicle having a covering part, which is held in position at an adjacent body part by means of snap connections, each snap connection comprising a snap hook which engages in an assigned recess, wherein the covering part is fastened at the body part without any additional fastening elements, snap hooks being integrally formed with the body part, which engage in recesses of the fitted-on covering part;

wherein an approximately horizontally aligned edge of the recess if formed by an elastically flexible web, said recess extending in a vertical plane, said web extending across the recess accommodating the snap hook and defining a slot opening extending adjacently to said web.

4,966,246

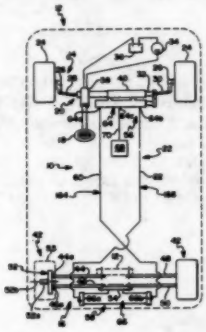
FOUR WHEEL STEERING SYSTEM

David A. Janson, Plymouth; Jerome V. Glinski, Jr., East Detroit, and David M. Preston, Madison Heights, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jun. 12, 1989, Ser. No. 364,413

Int. Cl.[5] B62D *5/06, 5/08*

U.S. Cl. 180—140 **20 Claims**



1. A hydraulic cylinder assembly including a housing having a cylindrical bore at its ends, a piston slidably and sealingly disposed in the bore and defining in cooperation with the housing first and second volumes which vary inversely in to to-and-fro axial movement about a neutral the piston in the bore, a ram affixed to the an slidably and sealingly extending through one e of the housing, first and second ports for respectively communicating the first and second volumes with a hydraulic circuit; characterized by:

first and second neutral valves fixed with respect to the housing, each valve having a low pressure port normally closed by a valving member and a high pressure port;

first and second means for respectively communicating the first and second valve high pressure ports with the first and second volumes;

chamber means for intercommunicating the low pressure ports; and

actuation means operative to move each valving member to the open position in response to movement of the piston to the neutral position and operative to allow each valving member to move to the normally closed position in response to a predetermined movement of the piston from the neutral position.

4,966,247

AUTOMATIC SPEED CONTROL SYSTEM FOR MOTORCYCLES

Yutaka Masuda, Fukuroi, Japan, assignor to Yamana Hatsudoki Kabushiki Kaisha, Iwata, Japan

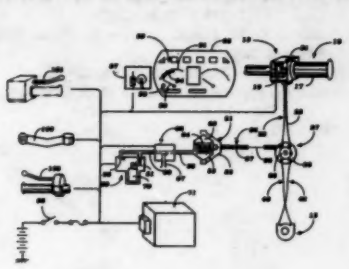
Division of Ser. No. 930,231, Nov. 13, 1986, Pat. No. 4,796,716, which is a division of Ser. No. 645,494, Aug. 29, 1984, Pat. No. 4,587,937. This application Oct. 24, 1988, Ser. No. 261,130

Claims priority, application Japan, Aug. 31, 1989, 58-1600037

Int. Cl.[5] B60K *31/18, 31/00*

U.S. Cl. 180—171 **2 Claims**

1. In an automatic speed control for a motorcycle comprising throttle means for controlling vehicle speed, operator control means for selectively positioning said throttle means, and selectively operable automatic speed control means for operating said throttle means to operate the vehicle at a preset speed, the improvement comprising indicator means for indicating only when the automatic speed control means is selectively energized to control engine speed.



4,966,248

TRACTION CONTROL SYSTEM

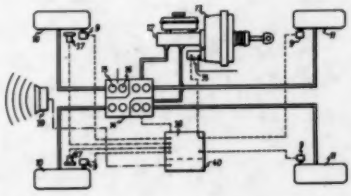
Glyn P. R. Farr, Warwick, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed Aug. 12, 1988, Ser. No. 231,579

Claims priority, application United Kingdom, Aug. 14, 1987, 8719299

Int. Cl.[5] B60T *8/62*

U.S. Cl. 180—197 **4 Claims**



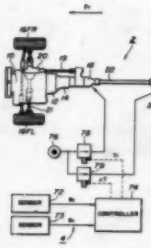
1. A traction control system for use in controlling the driven wheels of a road vehicle, comprising a master cylinder connected via a modulation unit to each wheel brake, the modulation unit being arranged to control the fluid pressure applied by the master cylinder to each wheel brake in dependence upon the relative speeds of the vehicle wheels, the fluid pressure produced by the master cylinder being provided by actual pressure on a brake pedal together with supplemental pressure provided by a vacuum servo unit, the vacuum servo unit incorporating an electromagnetic valve which, when de-energized, allows the servo unit to only operate to provide supplemental pressure when pressure is applied to the brake pedal, and, when energized, connects the servo unit to atmosphere so that the servo unit can by itself apply fluid pressure to a wheel brake via the modulation unit, the electromagnetic valve being energized when a wheel commences to spin faster than the other wheels.

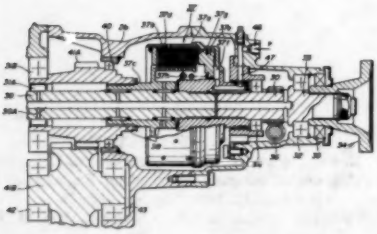
4,966,249

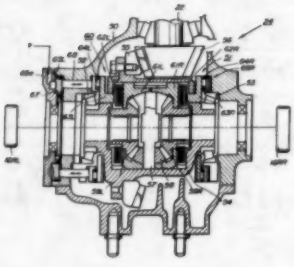
ACTIVE CONTROL FOR DISTRIBUTING DRIVING FORCE OVER FOUR-WHEELS OF FOUR-WHEEL DRIVE VEHICLE

Takashi Imaseki, Zushi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 11, 1988, Ser. No. 255,939
Claims priority, application Japan, Oct. 9, 1987, 62-255746
Int. Cl.[5] B60K *17/20, 23/04*
U.S. Cl. 180—233 5 Claims







1. A system for controlling torque distribution to a pair of primary driving wheels and a pair of secondary driving wheels of a motor vehicle when said motor vehicle is making a turn said vehicle having torque split and transfer means for varying a torque distribution ratio which is the ratio of a portion of torque distributed to said pair of secondary driving wheels to the remaining portion of torque distributed to said pair of primary driving wheels in response to a torque distribution ratio indicative signal, and limited slip differential means disposed between said pair of primary driving wheels for varying differential limiting force between said pair of primary driving wheels in response to a differential limiting force indicative signal, said system comprising:

means for detecting longitudinal acceleration to which said vehicle is subject and generating a longitudinal acceleration indicative signal;

means for detecting side acceleration to which said vehicle is subject and generating a side acceleration indicative signal; and

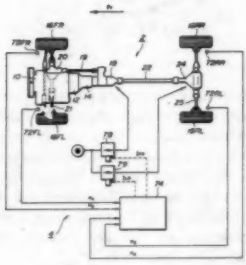
controller means for providing said torque distribution ratio indicative signal and said differential limiting force indicative signal in response to said longitudinal acceleration indicative signal and said side acceleration indicative signal.

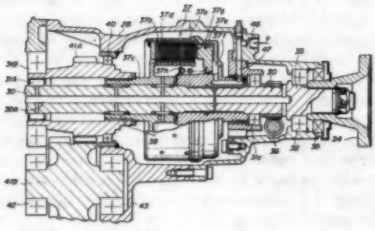
4,966,250

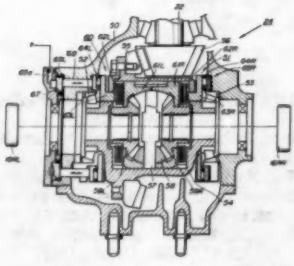
ACTIVE DRIVING FORCE CONTROL FOR FOUR-WHEEL DRIVE VEHICLE

Takashi Imaseki, Zushi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 11, 1988, Ser. No. 255,820
Claims priority, application Japan, Oct. 9, 1987, 62-255745
Int. Cl.[5] B60K *17/20, 23/04*
U.S. Cl. 180—233 6 Claims







1. A system for controlling torque distribution to a pair of primary driving wheels and a pair of secondary driving wheels

of a motor vehicle when said motor vehicle is making a turn, said vehicle having a torque split and transfer means for varying a torque distribution ratio which is the ratio of a portion of torque distributed to said pair of secondary driving wheels to the remaining portion of torque distributed to said pair of primary driving wheels in response to a torque distribution ratio indicative signal, and limited slip differential means disposed between said pair of primary driving wheels for varying differential limiting force between said pair of primary driving wheels in response to a differential limiting force indicative signal, said system comprising:

means for generating a wheel revolution speed differential indicative signal indicative of wheel revolution speed of an outer one of said pair of primary driving wheels and an inner one of said pair of primary driving wheels;

means for varying said distribution ratio indicative signal in such a direction as to cause said torque split and transfer means to decrease said torque distribution ratio and for varying said differential limiting force indicative signal in such a direction as to cause the said limited slip differential means to decrease differential limiting force when said wheel revolution speed indicative signal indicates that said wheel revolution speed of said outer one of said pair of primary driving wheels is higher than said wheel revolution speed of said inner one of said pair of primary driving wheels; and

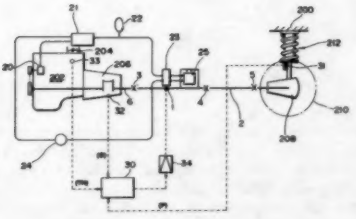
means for varying said differential limiting force indicative signal in such a direction as to cause the limited slip differential to increase the differential limiting force and varying the distribution ratio indicative signal in such a direction as to cause said torque split and transfer means to increase said distribution ratio when said wheel revolution speed differential indicative signal indicates that said wheel revolution speed of said inner one of said pair of driving wheels is higher than said wheel revolution speed of said outer one of the pair of driving wheels.

4,966,251

AUTOMOTIVE VEHICLE WITH CENTER BEARING OF PROPELLER SHAFT ASSEMBLY VARIABLE IN POSITION

Yoshinori Hirano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed May 23, 1989, Ser. No. 355,658
Claims priority, application Japan, May 24, 1988, 63-125044
Int. Cl.[5] B60K *17/22*
U.S. Cl. 180—338 **25 Claims**



1. An automotive vehicle, comprising:

a vehicle body;

means for generating a driving power;

a propeller shaft assembly having one end operatively coupled with said driving power generating means and an opposite end;

a differential operatively coupled with said opposite end of said propeller shaft assembly;

driving wheels operatively coupled with said differential;

a center bearing rotatably supporting said propeller shaft assembly at a predetermined portion disposed between said one and opposite ends of said propeller shaft assembly;

a bracket structure supporting said center bearing and fixedly connected to said vehicle body;

sensor means for sensing operating conditions which the automotive vehicle is subject to and generating sensor output signals;

means for generating a control signal in response to said sensor output signals; and

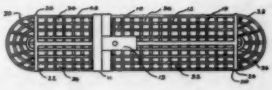
said bracket structure including means responsive to said control signal for varying a position of said center bearing relative to said vehicle body.

4,966,252

MICROPHONE WINDSCREEN AND METHOD OF FABRICATING THE SAME

Leslie C. Drever, 7760 Burnet Ave., Van Nuys, Calif. 91405

Filed Aug. 28, 1989, Ser. No. 399,142
Int. Cl.[5] G10K *11/00*; H04R *7/00*
U.S. Cl. 181—158 **6 Claims**



1. An improved microphone windscreen with a smooth level outer surface and enhanced acoustic properties, said windscreen comprising, in combination:

(a) a resilient tubular body member having open opposite front and rear ends and a sidewall defining a central space, said sidewall having a plurality of spaced openings extending therethrough, in communication with said space, said body member being adapted to house a microphone in said central space and protect said microphone from wind;

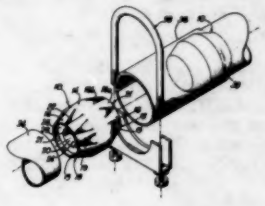
(b) resilient hollow curved front and rear end caps, each comprising a shell having a plurality of spaced openings extending therethrough, said end caps being welded or molded directly to said body member by a weld line at each of said front and rear ends to form a unitary structure having a smooth level outer surface throughout with lower wind resistance, improved strength and lower weight and with reduced sound obstruction.

4,966,253

MUFFLER DEVICE FOR EXHAUST SYSTEMS

Howard Stephens, 120 Price Hill Trail, Sugar Hill, Ga. 30518, and Roy W. Clark, 2526 McCormick Rd., Panama City, Fla. 32409

Filed Aug. 23, 1989, Ser. No. 397,239
Int. Cl.[5] F01N *7/08*
U.S. Cl. 181—227 **17 Claims**



1. A muffler device for installation within an exhaust pipe of an engine the exhaust pipe being of a given inner circumfer-

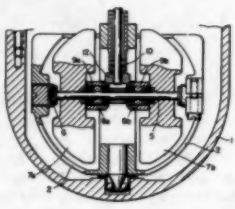
ence, the muffler serving to attenuate sound carried by engine exhaust gases passing through said exhaust pipe, comprising an outer pipe member having an outer circumference slightly less than the inner circumference of said exhaust pipe and a hollow center, said outer pipe member including tabs at each end thereof, said tabs being directed inwardly toward the hollow center of said outer pipe member forming a chamber within said outer pipe member having a narrowed opening relative to said outer circumference of said outer pipe member at each end thereof, a hollow inner pipe member disposed within said outer pipe member, said inner pipe member having a collar around each end thereof, said collars confining said inner pipe member between the tabs of the outer pipe member and within said chamber, whereby the engine exhaust gases passing through the exhaust pipe must pass through said muffler.

4,966,254

APPARATUS FOR CONVERTING EXTRINSIC USELESS OSCILLATION MOTIONS INTO USEFUL TORQUE

Kazuo Nakano, 1-8-19, Mishuku, Setagaya-ku, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 365,888
Claims priority, application Japan, Mar. 31, 1989, 1-78649
Int. Cl.[5] F03G *3/06, 1/08;* F16H *29/00*
U.S. Cl. 185—30 **3 Claims**



1. An apparatus for converting extrinsic useless oscillation motions such as those of ocean waves and the like into a useful constant torque, comprising:

a stationary frame;

a pair of horizontal rotating axles substantially perpendicular to each other, one of which axles is rotatably mounted on said stationary frame of said apparatus to constitute a first rotating axle while the other of which axles is rotatably mounted on said first rotating axle to constitute a second rotating axle;

swinging pendulums each of which is fixedly mounted on each of said rotating axles for rotatably driving said rotating axles under the influence of said extrinsic oscillation motions to which said swinging pendulums are subjected.

a unidirectional rotating means mounted on each of said rotating axles and an auxiliary axle for converting rotational motions of each of said rotating axles into a unidirectional rotation of said unidirectional rotating means; and

a gear train for combining said unidirectional rotation of said unidirectional rotating means into a unidirectional rotation of a torque-output shaft.

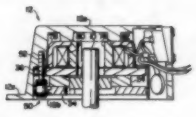
4,966,255

AUTOMATIC WEAR COMPENSATOR FOR ELECTROMAGNETIC BRAKE

Eric R. Fossum, Simsbury, Conn., assignor to Reliance Electric Industrial Company, Greenville, S.C.

Filed Nov. 16, 1988, Ser. No. 272,556
Int. Cl.[5] F16D *65/52*
U.S. Cl. 188—71.8 **7 Claims**

1. An electrically operable brake adapted for use with a rotatable shaft, comprising a brake housing, electromagnet means in said housing, an armature mounted for movement in the housing toward and away from the electromagnet means, a friction pad adjacent the armature, a pressure plate mounted adjacent the friction pad to provide a reaction surface for the pad and a predetermined spacing between the armature and the electromagnet means, pressure plate mounting means including at least one stud secured in said housing and having a projecting portion extending beyond the armature and in the direction of armature movement, said stud having a threaded end portion, a nut provided on said stud end portion, said nut serving to locate said pressure plate in position as aforesaid, a spring clutch wrap cylinder surface defined on said nut, a



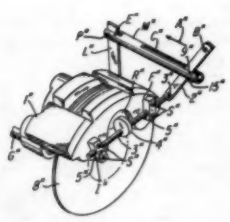
spring clutch element wrapped around said cylinder surface, and means coupling one end of said spring clutch element to said armature so that sequential movement of the armature by said electromagnet means can cause said spring clutch element to wrap tightly on said cylinder to rotate the nut and reposition the pressure plate and the friction pad and the armature relative said electromagnet means to compensate for wear of these components, said means coupling said spring clutch element to said armature comprising a bellcrank pivotably mounted to said armature and having an opening for receiving said one end of said spring clutch element.

4,966,256

EMERGENCY BRAKE

John D. Hunt, 6186 Sandbury Dr., Huber Heights, Ohio 45424

Filed Mar. 30, 1989, Ser. No. 331,616
Int. Cl.[5] F16D *55/224*
U.S. Cl. 188—72.7 **4 Claims**



1. An actuator arrangement for an emergency/parking brake system of a vehicle having disc brake means including a caliper housing with an outboard brake pad, an inboard brake pad and a rotor/disc therebetween capable of being actuated for engagement and disengagement in a brake unit, comprising:

a radially-extending crescent-shaped flange on the caliper housing in a location spaced along a side of said outboard pad and having a surface as well as a recess centrally and radially thereof;

a camshaft located to one side of the outboard pad in a location remote from the caliper housing and having a predetermined location relative to said flange;

journalling means mounting said camshaft relative to said caliper housing and positioned for providing predetermined limited pivotal movement of said camshaft in a location spaced relative to said flange;

an actuating lever secured to an end of said camshaft in a location extending radially thereof;

spring means biasing said actuating lever in a predetermined direction;

cam means rigidly attached to said actuating lever for pivotal movement by said camshaft against said outboard pad to move said outboard pad into engagement with the rotor disc of said brake unit, said rotor/disc being sandwiched between said inboard pad and said outboard pad;

a pair of rectangular block members provided as the journal mounting of said camshaft to position said cam means for engaging and disengaging said outboard pad and said inboard pad with respect to said rotor disc of said brake unit;

said actuating lever at a location remote from said camshaft fastened thereto extending through a forked bifurcated member associated therewith;

a link secured to said actuating lever at an intermediate location between opposite ends thereof, said spring means abutting a free end of said link for biasing said actuating lever in said predetermined direction;

said spring means being anchored at one end and a pivot bolt being secured through an opening of said actuating lever for pivotal connection of said link thereto; and

said forked bifurcated member being a hollow tubular means slotted longitudinally and axially thereof, said spring means being mounted in said hollow tubular member for stress of said spring means by pivotal movement of said actuating lever.

4,966,257

SHOCK ABSORBING OR OSCILLATION DAMPER DEVICE

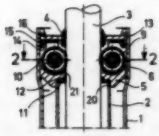
Ludwig Axthammer, Hambach, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Jun. 12, 1989, Ser. No. 365,927

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1988, 3820333

Int. Cl.[5] F16F *9/36*

U.S. Cl. 188—322.17 **13 Claims**



1. A shock absorbing device comprising at least one tube member (1, 2), said tube member (1, 2) having a tube axis and two ends and defining at least one cavity therein, and further comprising a piston rod member (3), said piston rod member (3) extending axially inwards and outwards of said cavity through one of said ends and being guided adjacent to one of said ends by a sealing and guiding assembly (5, 6, 4), said sealing and guiding assembly (5, 6, 4) including a plurality of guiding rollers (6) being distributed about said tube axis and being rotatably mounted on a roller carrier (5) about roller axes lying in at least one plane which is substantially perpendicular to said tube axis with each of said roller axes being substantially perpendicular to a radius of said tube axis, said guiding rollers (6) having with respect to a cross-section containing the respective roller axes a circumferential guiding surfaces (7) adapted to an external circumferential surface of said piston rod member (3), said roller carrier (5) being covered at the end thereof remote from said other end of said tube member (1, 2) by a covering unit (13, 16, 14, 4), said covering unit (13, 16, 14, 4) being in sealing engagement with both an inner circumferential surface of said tube member (1) and said external circumferential surface of said piston rod member (3), with said covering unit (13, 16, 14, 4) comprising an axially inner annular cover member (13) being cranked towards said other end of said tube member (1) adjacent to a radially outer edge of said inner cover member, a radially outer gasket member (15) being accommodated radially between said cranked portion (14) of said axially inner cover member (13) and said inner circumferential surface of said tube member (1).

4,966,258

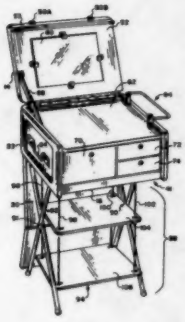
COMBINATION LUGGAGE, TABLE AND VANITY

Marilyn J. Hawley, 1905 "G" St., Apt. #15, Lincoln, Nebr. 68510

Filed Jun. 13, 1989, Ser. No. 365,296

Int. Cl.[5] A45C *9/00, 15/04;* **A47B** *3/10*

U.S. Cl. 190—4 **14 Claims**



1. A combination luggage, table and vanity having a luggage position, a table position and a vanity position comprising:

a front wall;

left and right-hand sides;

a back wall;

one of said back wall, right side and left side having a handle thereon for carrying said combination luggage, table and vanity when in the luggage position;

a top wall;

a first hinge means for pivotally connecting a rear edge of the top wall to a top edge of the back wall wherein the top wall may lie horizontal while said combination is in the table position and extend vertically when in the vanity position;

latch means removably connecting the front edge of said top wall to the top edge of said front wall, whereby said top wall and front wall may be held closed when the combination luggage, table and vanity is in the luggage position;

a bottom wall;

a second hinge means for pivotally connecting a bottom edge of said back wall to a rear edge of said bottom wall;

a third hinge means for pivotally connecting a front edge of the bottom wall to a bottom edge of said front wall wherein said bottom wall and said front wall are closable when the combination luggage, table and vanity is in the luggage position;

internal walls forming a storage compartment closed by said bottom wall, whereby a stand may be stored;

drawers in a front side of said combination luggage, table and vanity behind said front wall, whereby said front wall may be pivoted about said third hinge means to expose said drawers when the combination luggage, table and vanity is in the vanity position;

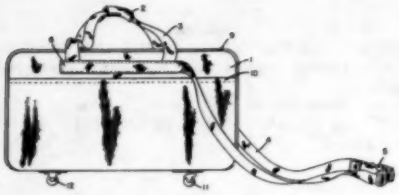
said combination luggage, table and vanity having dimensions no greater than 9×23×45 inches when in the luggage position.

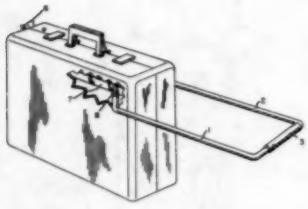
4,966,259

LUGGAGE CONTAINER WITH PULL HANDLE

Mady I. Bergman, 216 Pacific Ave., Venice, Calif. 90291

Filed Feb. 4, 1988, Ser. No. 152,147
Int. Cl.[5] A45C *13/30*
U.S. Cl. 190—18 A 11 Claims





1. A luggage container comprising:

(a) a container body having first and second opposing vertical sides and a bottom member, the first vertical side having a first forward edge, a first rear edge, a first top edge, a first bottom edge, and a first horizontal length between the first forward and rear edges, and the second vertical side having a second forward edge, a second rear edge, a second top edge, a second bottom edge, and a second horizontal length between the second forward and rear edges, the bottom member being attached to the vertical sides between the first and second bottom edges, respectively, the body forming an enclosed cavity between the first and second vertical sides and above the bottom member, the body having means for opening and closing the container, the first and second horizontal lengths being about the same;

(b) wheel means for moving the container body horizontally along a ground surface, the wheel means being attached to and extending outwardly from the bottom member of the container body;

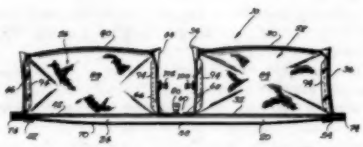
(c) a flexible strap for pulling the container along the ground surface having first and second attaching ends, the first attaching end being attached at a first forward point of attachment on the first vertical side and at a first rearward point of attachment on the first vertical side; the second attaching end being attached at a second forward point of attachment on the second vertical side and at a second rearward point of attachment on the second vertical side; the first and second forward points of attachment being about the same horizontal distance from the first and second forward edges and about the same vertical distance from the first and second bottom edges, respectively, the horizontal distance between said first forward and rearward points of attachment being a major portion of said first horizontal length, and the horizontal distance between said second forward and rearward points of attachment being a major portion of said second horizontal length.

4,966,260

TRAVEL BAG WITH MULTIPLE COMPARTMENTS

Raymond W. Young, West Bend, Wis., assignor to Amity Leather Products Co., West Bend, Wis.

Continuation of Ser. No. 60,723, Jun. 10, 1987, Pat. No. 4,821,853. This application Mar. 15, 1989, Ser. No. 324,296
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] A45C *3/00, 13/10, 13/36*
U.S. Cl. 190—111 10 Claims



1. A travel kit comprising:

first and second generally parallelepiped compartments, each having an upper wall and a lower wall, inner and outer sidewalls, and a pair of end walls, the upper and lower walls having preselected widths, each of said first and second compartments comprising a single, integral member which makes up the outer sidewall, end walls, lower wall, and an outer portion of the upper wall of the respective compartment;

flexible connecting means joining said first and second compartments;

slide fastener closures extending along each upper wall, each of said slide fastener closures having a width substantially less than the width of s. l upper walls;

spacing means in each of said compartments for maintaining the generally parallelepiped configurations thereof, said spacing means extending between said side walls;

said first and second compartments being pivotable about said connecting means to a position in which said upper walls of said respective compartments and their associated slide fastener closures face each other, and the travel kit assumes a relatively low profile;

a looped strap disposed substantially centrally of one end of said connecting means for suspending said travel kit;

a third compartment defined by portions, respectively, of said first compartment, said second compartment, and said connecting means; and

a third slide fastener closure providing controlled access to said third compartment, said third slide fastener closure extending along the length of said connecting means.

4,966,261

LOCK-UP TORQUE CONVERTER FOR AUTOMATIC TRANSMISSIONS

Satoshi Kohno, and Hirofumi Ara, both of Kanagawa, Japan, assignors to Atsugi Motor Parts Company, Limited, Kenagawa, Japan

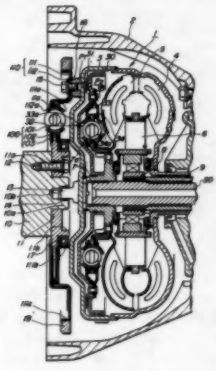
Filed Jul. 3, 1989, Ser. No. 374,748
Claims priority, application Japan, Jul. 7, 1988, 63-169960
Int. Cl.[5] F16H *45/02;* F16F *15/12*
U.S. Cl. 192—3.29 8 Claims

1. A lock-up torque converter for automatic transmissions which transmits torque generated by an internal combustion engine from the output shaft thereof to the transmission input shaft, and which includes a converter cover, a turbine hub receiving said input shaft to provide a driving connection, a clutch piston slidably mounted on said turbine hub, and a turbine runner having an outer shell drivingly connected to said hub, comprising:

first means for damping torsional vibration, said first damping means operably connected between said clutch piston and said turbine hub to provide a driving connection only

when said clutch piston engages said converter cover, said first means comprising a plurality of torsion springs operable in parallel with each other; and

second means for damping torsional vibration, said second damping means operably connected between said output shaft and said converter cover to provide a driving con-



nection during operation of the engine, said second means comprising a plurality of torsion springs operable in parallel with each other,

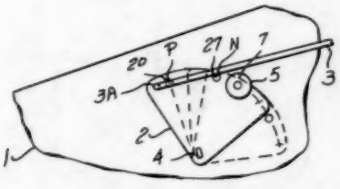
whereby said first and second means are cooperatively operated in series with each other only when said clutch piston engages said converter cover.

4,966,262

TRANSMISSION SAFETY LOCKING LEVER APPARATUS

Walter L. Mieczkowski, 33611 Curcio Dr., Sterling Heights, Mich. 48310

Filed Jul. 17, 1989, Ser. No. 380,308
Int. Cl.[5] B60K *41/26*
U.S. Cl. 192—4 A **14 Claims**



1. A safety locking lever apparatus for selectively locking a vehicle transmission in park or neutral modes of operation and permitting the transmission to be shifted to reverse or drive modes of operation through movement of a gear selector mounted in the vehicle and connected through a pivotally connected shift control rod and a gear shift lever to a gear shift shaft extending from the transmission and placing the transmission in the park, reverse, neutral and drive modes of operation when selectively advanced through a plurality of discrete positions only when the vehicle fluid pressure operated brakes are applied, the apparatus comprising:

the gear shift lever including a first portion fixedly mounted on the gear shift shaft and a second, arcuate-shaped section integral with the first portion;

first and second spaced apertures formed in the second arcuate-shaped section of the gear shift lever at equal radial distances from the connection of the first portion of the gear shift lever to the gear shift shaft;

a lock pin movable between an extended position and a retracted position;

means for biasing the lock pin to the extended position;

actuator means for retracting the lock pin to the retracted position when activated;

means for mounting the lock pin such that the lock pin is engageable, when in the extended position, with one of the first and second apertures in the gear shift lever when the gear shift lever and the gear shift shaft are in a position selecting one of the park and neutral transmission operating modes; and

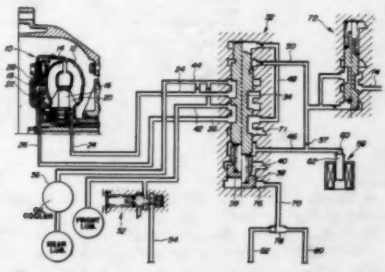
sensor means, responsive to a predetermined pressure at which the vehicle brakes are applied, for connecting the actuator means to an electric power source to activate the actuator means to retract the lock pin.

4,966,263

SYSTEM FOR CONTROLLING LOCK-UP CLUTCH

Koichi Hayasaki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Nov. 20, 1989, Ser. No. 438,205
Claims priority, application Japan, Nov. 22, 1988, 63-151341[U]
Int. Cl.[5] F16H *61/14*; F16D *25/14*
U.S. Cl. 192—3.3 **6 Claims**



1. A system for controlling a lock-up clutch of a hydraulic torque transmitting device including a pump impeller and a turbine runner, the lock-up clutch being hydraulically engaged to mechanically connect the turbine runner with the pump impeller, the lock-up clutch being disengaged to mechanically disconnect the turbine runner from the pump impeller, the system comprising:

a lock-up control valve including a spool having a lock-up clutch engagement position and a lock-up clutch release position;

hydraulic means fluidly disposed between the hydrodynamic torque transmitting device and said lock-up control valve for supplying hydraulic fluid to the hydrodynamic device to cause engagement of the lock-up clutch when said spool of said lock-up control valve assumes said lock-up clutch engagement position and to allow disengagement of said lock-up clutch when said spool of said lock-up control valve assumes said lock-up clutch release position;

means for hydraulically biasing said spool to one of said lock-up clutch engagement and release positions, selectively;

said lock-up control valve including a plug with a pressure acting area, said plug being adapted to lock said spool to said lock-up clutch release position when said pressure acting area is exposed to a predetermined hydraulic pressure;

means for generating a first speed indicative hydraulic pressure signal;

means for generating a reverse speed indicative hydraulic pressure signal;

hydraulic passage means fluidly disposed between said first speed indicative hydraulic pressure signal generating means, said reverse speed indicative hydraulic pressure signal generating means, and said pressure acting area of said plug, said hydraulic passage means allowing passage of one of said hydraulic pressure signals to act on said pressure acting area as said predetermined hydraulic pressure.

4,966,264

THRUST WASHER MOUNTING APPARATUS

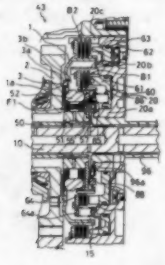
Youichi Hayakawa, Toyoake; Chihiro Hosono, Anjo; Masaaki Nishida, Anjo, and Kozo Kato, Anjo, all of Japan, assignors to Aisin Aw Co., Ltd., Anjo, Japan

Filed Jan. 4, 1989, Ser. No. 293,249

Claims priority, application Japan, Aug. 11, 1988, 63-201401

Int. Cl.[5] F16D *11/00*

U.S. Cl. 192—3.34 **4 Claims**



1. A thrust washer mounting apparatus for an automatic transmission, comprising:

a thrust washer having a side surface, a plurality of protrusions formed on the side surface to project parallel to an axial direction thereof, and at least one projecting pawl formed on at least one of the protrusions to further project outwardly from the protrusion, said projecting pawl having a front tapered surface and an upstanding rear surface, and

at least one rotating member having a plurality of through holes corresponding to the protrusions, said protrusions, when inserted into the through holes, passing through the through holes so that the upstanding rear surface of the projecting pawl prevents the protrusions from disengaging from the through holes to thereby directly transfer rotational force of the rotating member to the thrust washer through the protrusions, said pawl so dimensioned to permit a degree of an axial movement between said thrust washer and said rotating member while maintaining engagement between said protrusions and said holes.

4,966,265

CLUTCH

Helmut Wiese, Neunkirchen-Seelscheid, and Paul-Erich Schönenbrücher, Much-Kranüchel, both of Fed. Rep. of Germany, assignors to Viscodrive GmbH, Lohmar, Fed. Rep. of Germany

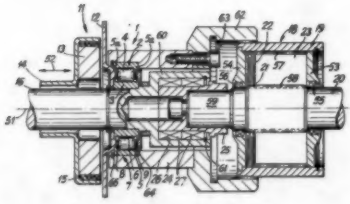
Filed Aug. 29, 1989, Ser. No. 399,866

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1988, 3830200

Int. Cl.[5] F16D *41/00*

U.S. Cl. 192—35 **19 Claims**

1. A clutch comprising concentric inner and outer parts rotatable about a common axis and having respectively outwardly and inwardly facing cylindrical races, a plurality of cylindrical rollers interposed between and engaging said races, a cage arranged to hold the rollers in circumferentially spaced relation, the cage comprising two separate parts, one part embracing the one ends of the rollers and the other part embracing the other ends of the rollers, resilient means for connecting said cage parts and biasing them to relative positions in



which the longitudinal axes of the rollers are parallel to said common axis so that said rollers may roll around the races, and brake means associated with one of said cage parts and operable when the cage is rotating about said common axis to retard said one cage part relative to said other cage part so that the rotary axes of the rollers become inclined to said common axis and the rollers jam between the inner and outer races.

4,966,266

CLUTCH FOR AUTOMOBILE DOOR LOCK ACTUATOR

Shinjiro Yamada, and Seiki Satoh, both of Utsunomiya, Japan, assignors to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,422

Claims priority, application Japan, Mar. 19, 1988, 63-66978; May 12, 1988, 63-115739

Int. Cl.[5] F16D *43/02*; E05B *47/00*; F16H *57/00*

U.S. Cl. 192—39 **4 Claims**

1. An actuator for an automobile having a motor comprising:

a speed reduction mechanism having an input side connected to said motor and an output side provided with an engagement section;

a first rotor provided with a predetermined rotational resistance; at least one engagement rod slidably provided in said first rotor, inwardly biased by a spring providing a spring force weaker than the force of said resistance and outwardly projected with an inner end in engagement with said engagement section with rotation of said mechanism; and

a second rotor with an engagement piece to engage with an outer end of said rod and connected to a door lock device;

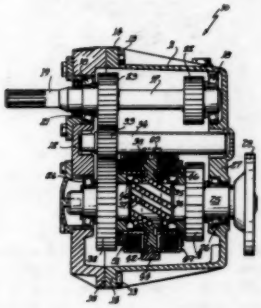
said mechanism and said second rotor being coupled together directly via said rod when said motor is rotated, said second rotor and said rod being disengaged from each other when said motor is stopped.

4,966,267

BALL SCREW ACTUATED CLUTCH COMBINATION

Kenneth E. Carlton, Muncie, Ind., assignor to Borg-Warner Automotive Diversified Transmission Products Corporation, Sterling Heights, Mich.

Filed Sep. 21, 1989, Ser. No. 410,561
Int. Cl.[5] F16D *21/04, 3/14*
U.S. Cl. 192—48.91 13 Claims



1. A clutch arrangement for use in a transmission having forward and reverse gears, wherein the transmission includes an input shaft, an output shaft, axially spaced first forward and reverse gears mounted for rotation with the input shaft, axially spaced second forward and reverse gears mounted for rotation on the output shaft, said forward gears on the two shafts being in meshing engagement, an idler shaft carrying an idler gear in meshing engagement with the reverse gears on the two shafts, and a clutching device encompassing the output shaft for actuation of the output shaft in either the forward or reverse direction, the improvement comprising a shift collar encompassing the output shaft, a ball screw mechanism between the shift collar and the output shaft, and a pair of opposed clutch devices forming a first clutch between the shift collar and the second forward gear and a second clutch between the shift collar and the second reverse gear, said shift collar being a unitary member having an inner cylindrical sleeve portion and an outer cylindrical sleeve portion joined by a radial flange, said inner sleeve portion encompassing the output shaft and the outer sleeve portion receiving an externally actuated shift fork.

4,966,268

DRIVING POWER TRANSMISSION DEVICE

Hiroaki Asano, Okazaki; Kyosuke Haga, Anjyo, and Isao Ito, Iwakura, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Jun. 30, 1989, Ser. No. 374,143
Claims priority, application Japan, Jul. 7, 1988, 63-169320
Int. Cl.[5] F16D *31/00*
U.S. Cl. 192—58 C 6 Claims

1. A driving power transmission device for transmitting a driving power between first and second shafts comprising:

a housing connected to said first shaft;

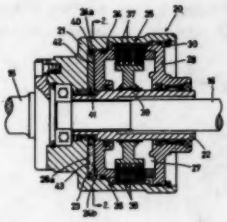
clutch means received in said housing for transmitting said driving power between said housing and said second shaft when said clutch means is actuated;

a piston received in said housing for actuating said clutch means, said piston and said housing defining a cylindrical space;

blade means received in said cylindrical space for rotation in a rotation direction in response to a rotational speed difference between said first and second shafts, the rotational direction being determined by which of the first and second shafts rotates faster than the other of the shafts;

a high viscous fluid filled in said cylindrical space for displacement by said blade means to generate a pressure for pushing said piston towards said clutch means in said cylindrical space;

wherein said blade means has at least one blade which extends along a radial direction of the cylindrical space and has first and second side surfaces located opposite one



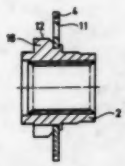
another as viewed in the rotational direction of the blade means, the first and second side surfaces having different shapes for displacing the viscous fluid to change transmissive torque depending upon the rotational direction of the blade means by varying the pressure for pushing said piston towards said clutch means.

4,966,269

CLUTCH DISC HAVING A HUB DISC AND A SINTERED STEEL HUB BLANK AND A METHOD OF PRODUCING THE CLUTCH DISC

Harald Raab, Schweinfurt; Manfred Klein, Volkach; Nikolaus D. Mackert, Sennfeld; Karlheinz Hofmann, Gochsheim, and Gerhard Bittenbring, Schweinfurt, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 357,088
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818812
Int. Cl.[5] F16D *13/58*
U.S. Cl. 192—70.16 11 Claims



1. A clutch disc for a friction clutch, comprising an axially extending internally toothed hub (2) having an external axially and circumferentially extending surface and comprising at least in part a thermally treated sintered steel and having said external surface having an axially and circumferentially extending section with a profile (12) differing from a cylindrical form and said section having a radially extending face (154) forming a stop surface facing in the axial direction, and a hub disc (4) of annular disc form with an axially and circumferentially extending internal profile (13) complementary to the profile (12 of the section of said hub (12) and set non-rotatable upon the profile (12), said hub disc being axially fixed on said hub between said radially extending face and material deformation zones (27) formed on the hub (2) by material deformation of the hub, the hub (2) comprises at least in the region of the material deformation zones (27), said sintered steel with a material density of at least 7 g./cm^3.

4,966,270

HYDRAULICALLY OPERATED DOUBLE CLUTCH FOR A MOTOR VEHICLE

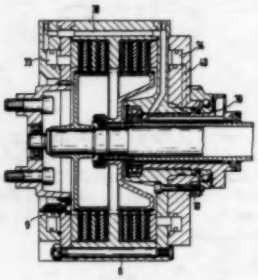
Siegfried Rispeter, Besigheim; Hubert Müller, Tiefenbronn, and Rainer Wüst, Wiernsheim, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 363,715

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819702

Int. Cl.[5] F16D *25/10*

U.S. Cl. 192—87.15 14 Claims



1. A hydraulically operated double clutch, for the alternate coupling of a central shaft and of a hollow shaft, which is concentric to this central shaft, of a speed change gear of a motor vehicle with a clutch housing driven by an engine output shaft, comprising at least one left clutch disk connected with the central shaft and located at one side of the hydraulically operated double clutch, at least one right clutch disk connected with the hollow shaft and located at the right side of the hydraulically operated double clutch, said at least one left and one right clutch disks being alternatively pressable against a center plate of the rotating clutch housing by means of annular pistons, these annular pistons being arranged concentrically with respect to the central shaft and being fitted in between a cover plate and a lateral plate of the clutch housing, which lateral plates are screwed together with a respective one of the cover plates, wherein one said annular piston is fitted in at a plane between a left cover plate of said cover plates and a respective lateral plate of said lateral plates, and the other said annular piston is fitted in at a plane between a right cover plate of said cover plates and a respective lateral plate of said lateral plates of the clutch housing, and wherein the clutch disks with the annular pistons can be operated by several cylindrical pins which rest against end faces of the clutch disks and which pins are guided in the lateral plates.

4,966,271

APPARATUS FOR CONVEYING A TRANSPORT PLATFORM TO A LIFTING TABLE OF A STACKING STATION

Erwin Jenkner, Lindenstr. 13, D-7261 Bechingen-Bergwald, Fed. Rep. of Germany

Division of Ser. No. 194,679, May 13, 1988, Pat. No. 4,929,147. This application Oct. 19, 1989, Ser. No. 424,074

Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716203

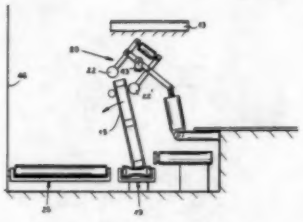
Int. Cl.[5] B65G *47/22*

U.S. Cl. 198—409 14 Claims

1. In an apparatus for conveying at least one transport platform to at least one lifting table of at least one stacking station for stacking a plurality of panels fed to said stacking station, the improvement which comprises:

a retaining device positioned adjacent said stacking station for holding said transport platform in a normal position either vertical or inclined to vertical;

means for bringing said transport platform held by said retaining device in said normal position into horizontal position on said lifting table of said stacking station located in a predetermined receiving position by tipping,



a first conveyor disposed and constructed to feed said transport platform to a row of said stacking stations; and

at least one other conveyor for conveying or transferring said transport platform in said normal position adjacent one of said stacking stations.

4,966,272

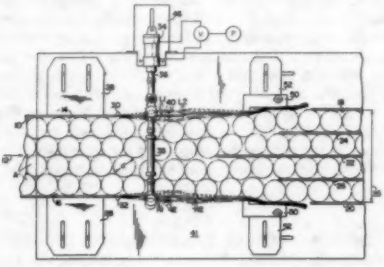
PRODUCT DIVIDER

John L. Raudat, North Madison, Conn., assignor to Standard-Knapp, Inc., Portland, Conn.

Filed Sep. 25, 1989, Ser. No. 411,694

Int. Cl.[5] B65G *27/00*

U.S. Cl. 198—446 7 Claims



1. Apparatus for reorienting nested cylindrically shaped articles of diameter d and provide N individual columns of such articles, said apparatus comprising:

(a) a fixed frame,

(b) conveyor means for supporting by frictionally engaging the underside of the articles and advancing them in a downstream direction to the fixed frame,

(c) left and right hand vertically oriented intake lane guides mounted on said frame and having inner surfaces that define a path for the nested articles said path having a width $\sqrt{3}/2(N-1)d+d$ where N equals the number of individual article columns and d equals the diameter of the articles,

(d) left and right primary lane guide segments pivotably mounted to downstream ends of said left and right hand intake lane guides respectively,

(e) left and right secondary lane guide segments pivotably mounted to downstream ends of said primary lane guide segments, respectively,

(f) means for oscillating said left and right primary lane guide segments through a range of angular positions that

include respective positions that lie in the respective planes of said left and right lane guides, respectively,

(g) means coupling said left and right secondary lane guide segments to said fixed frame to control movement of the downstream ends of said left and right secondary lane segments so that the overall width of said path in the area of said coupling means and said secondary lane guide elements is held to N×d.

4,966,273

DISTRIBUTIVE SUPPLY DEVICE FOR COMBINATORIAL WEIGHING APPARATUS

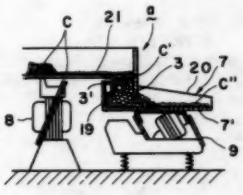
Takashi Sashiki, Nagaokakyo, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan

Continuation of Ser. No. 279,259, Dec. 1, 1988, abandoned, which is a continuation of Ser. No. 142,249, Jan. 7, 1988, abandoned, which is a continuation of Ser. No. 865,595, May 20, 1986, abandoned, which is a continuation of Ser. No. 771,486, Sep. 3, 1985, abandoned, which is a continuation of Ser. No. 449,576, Dec. 14, 1982, abandoned. This application Dec. 29, 1989, Ser. No. 462,294

Claims priority, application Japan, Dec. 25, 1981, 56-198203

Int. Cl.[5] B65G *37/00*

U.S. Cl. 198—601 **4 Claims**



3. A combinatorial weighing apparatus having a plurality of weighing mechanisms and a distributive supply device for supplying articles to be weighed to said weighing mechanisms, comprising:

a first vibration generator;

a supply container mounted on said first vibration generator for distributing articles, said container including a substantially circular plate having a solid center portion, an outer circumferential wall having an inner surface mounted on the circumference of the plate and a plurality of openings disposed in said plate along the inner surface of said circumferential wall;

a plurality of first tubular chutes disposed at respective ones of said openings, each tubular chute having an upper end for receiving articles from said supply container and a lower end;

a plurality of second vibration generators; and

a plurality of supply troughs, disposed radially with respect to said supply container, associated with respective ones of said first tubular chutes, and mounted on respective ones of said second vibration generators, each supply trough having a rear end wall, a pair of side walls extending outwardly from the rear end wall whereby the lower end portion of the associated first tubular chute is partly surrounded by the rear end wall and the side walls at a predetermined distance, an open end, and a bottom plate spaced a predetermined distance from the lower end of the associated first tubular chute.

4,966,274

CONTROL SYSTEM FOR A WALKING BEAM ASSEMBLY OF A FORGING PRESS

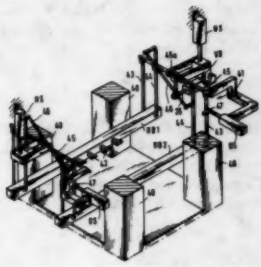
Walter Willenbrock, and Eberhard Werner, both of Leverkusen, Fed. Rep. of Germany, assignors to Eumuco Aktiengesellschaft Für Maschinenbau, Leverkusen, Fed. Rep. of Germany

Filed Jun. 20, 1988, Ser. No. 209,275

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721694

Int. Cl.[5] B65G *25/00*

U.S. Cl. 198—621 **25 Claims**



1. A control system for a walking beam assembly of a forging press having a press stroke with a predetermined operating cycle in which a workpiece is forged during the press stroke, and the walking beam assembly has at least one walking beam member movable by respective driving means in a cycle of movement phases including a closing movement, a lifting movement, an advance movement, a lowering movement, an opening movement, and a return movement, said respective driving means being operated by control mechaniams in a sequential control, said control system comprising:

(a) means for predetermining the lengths of cycle time periods for each of the opening and return movement phases to provide a selected fixed cycle time length having the shortest cycle time period possible with respect to the duration of a press stroke, and

(b) means for varying the time lengths of at least some of the remaining movement phases to provide a preselected variable cycle time length dependent upon the mass of the workpiece being handled,

(c) a step motor is operatively connected for effecting each movement phase.

4,966,275

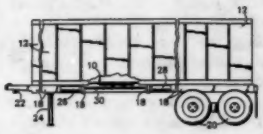
RECIPROCATING CONVEYOR WITH DETACHABLE POWER DRIVE

Olof A. Hallstrom, Jr., 1920 Hallstrom Rd., Tillamook, Oreg. 97141

Filed Jan. 27, 1989, Ser. No. 302,555

Int. Cl.[5] B65G *25/00*

U.S. Cl. 198—750 **17 Claims**



1. A reciprocating conveyor, comprising:

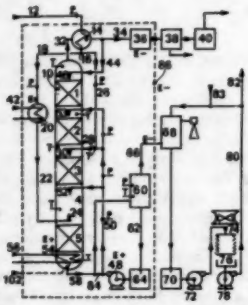
(a) an elongated conveyor frame,
(b) a plurality of groups of elongated load-supporting slats mounted to and forming the load-supporting and load-moving bottom of the conveyor frame, the slats being arranged for selective simultaneous and independent longitudinal reciprocation in load-moving and slat-retracting directions, respectively,
(c) an elongated support frame arranged to detachably mount the elongated conveyor frame, and
(d) a plurality of slat drive means secured to the support frame and each arranged to releasably engage one of the groups of reciprocative slats for reciprocating them, whereby when the conveyor frame is detached from the support frame the plurality of slat drive means remain with the support frame.

4,966,276

PROCESSES FOR CONCENTRATING NITRIC ACID

Alfred A. Guenkel, Kfupm #846, Dhahran 312161, Saudi Arabia

Continuation-in-part of Ser. No. 163,492, Feb. 22, 1988, abandoned. This application Apr. 17, 1989, Ser. No. 338,692
Int. Cl.[5] B01D *3/34*
U.S. Cl. 203—13 **20 Claims**



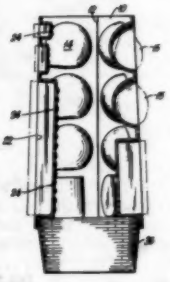
1. A process for an integrated concentration of nitric acid and reconcentration of a dehydrating agent, said process comprising the steps of:
(a) splitting a feed stream of an aqueous solution of weak nitric acid to be concentrated to result in a larger fraction and a smaller fraction;
(b) vaporizing at least the larger nitric acid fraction to result in a larger nitric acid vapor fraction;
(c) directly contacting the larger nitric acid vapor fraction with a first portion of the dehydrating agent in a column to bind the water therefrom and result in a concentrated vapor stream of nitric acid and a diluted stream of said first portion of the dehydrating agent;
(d) mixing the smaller fraction of the weak nitric acid and a second portion of the dehydrating agent;
(e) contacting the concentrated vapor stream of nitric acid in the column with the mixture resulting from step (d) to result in a more concentrated vapor stream of nitric acid and a diluted stream of said second portion of the dehydrating agent;
(f) condensing the more concentrated nitric acid vapor stream from step (e) to obtain a condensed more concentrated nitric acid;
(g) boiling the diluted streams of said first and second portions of the dehydrating agent from steps (c) and (e) to remove nitric acid therefrom and to produce spent dehydrating agent; and
(h) collecting, reconcentrating and recirculating the spent dehydrating agent of step (g) for use in steps (c) and (d).

4,966,277

BASKET FRAME

Andrew Razzore, 98 Norwalk Ave., Staten Island, N.Y. 10314

Filed Aug. 10, 1989, Ser. No. 392,000
Int. Cl.[5] A65D *5/50*
U.S. Cl. 206—44 K **3 Claims**



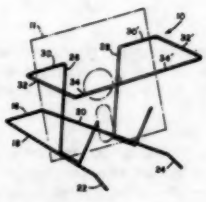
1. A tubular extension for a basket formed from a sheet of pliant, self-supporting material, said sheet being bent to the point where its opposite edges meet to form a tube, cooperating means at the edges for holding the tube together, said tube having recesses formed in its wall to hold objects, one end of said tube being insertable in a basket, the other end extending upwardly therefrom.

4,966,278

DISKETTE HOLDER

Ronald Rosi, 27 Skyline Dr., Billerica, Mass. 01821, and Valerie C. Sullivan, 62 Ridge Rd., Lowell, Mass. 01852

Filed Jun. 13, 1989, Ser. No. 365,749
Int. Cl.[5] B65D *85/57*
U.S. Cl. 206—444 **15 Claims**



1. A diskette holder comprising:
a base portion including a pair of spaced elongated side members each having front and rear end portions and a transverse member joining said rear end portions;
a rack portion including a pair of parallel rearward members extending upwardly from the respective base side members;
angular members extending outwardly, forwardly and inwardly relative to and from the respective rearward members; said angular members forming an overall generally rectangular support structure in the horizontal plane, said rectangular support structure providing respectively rearward, lateral and forward support means to diskettes in the holder; and
a pair of forward members extending upwardly and forwardly from the respective base side members at a selected distance forward of the rearward members;
said forward members adapted to limit the forward movement of the base portions of diskettes in the holder.

9. A diskette holder comprising:
a base portion including a pair of spaced elongated side members each having front and rear end portions and a transverse member joining said rear end portions;
a rack portion including a pair of parallel rearward members extending upwardly from the respective base side members;
angular members extending outwardly and forwardly from the respective rearward members;
a first transverse member connecting said forward angular members;
said outwardly extending angular members and transverse member providing respectively rearward and forward support means to diskettes in the holder;
a pair of forward members extending upwardly and angled forwardly from the respective base side members at a selected distance forward of the rearward members;
said forward members adapted to limit the forward movement of the base portions of diskettes in the holder; and
a second transverse member connecting said forward members.

12. A diskette holder for flexible diskettes having envelopes with access openings comprising:
an elongated base member having a front end and a rear end; said front end having a downwardly extending portion whereby the elongated base member is inclined upwardly from the rear end to front end;
a container for supporting diskettes;
said container having a rectangular bottom wall fixedly attached to said base member, said bottom wall having a width greater than the length thereof;
a forward support wall secured to and adapted to extend angularly outward from the front portion of said bottom wall;
a rearward support wall secured to and adapted to extend angularly outward from the rear portion of said bottom wall;
said forward and rearward support walls having corresponding apertures each disposed in the centers of the forward and rearward walls and extending downwardly from the top surfaces thereof whereby contact of the forward and rearward walls with the access opening of the diskette envelope maybe prevented; and
a pair of end walls secured to and adapted to extend vertically from each side portion of said bottom wall, each being joined to the adjacent forward and rearward support walls;
said forward support wall providing a front support at a forward angle when diskettes are flipped forward for selection, and said rearward support wall providing a rear support at a rearward angle for display and normal storage of the diskettes.

14. A diskette holder comprising:
an elongated base member having a front end and a rear end;
a container for supporting diskettes;
said container having a rectangular bottom wall attached to said base member, said bottom wall having a width greater than the length thereof;
a forward support wall secured to and adapted to extend angularly outward from the front portion of said bottom wall;
a rearward support wall secured to and adapted to extend angularly outward from the rear portion of said bottom wall; and
a pair of end walls secured to and adapted to extend vertically from each side portion of said bottom wall, each being joined to the adjacent forward and rearward support walls;
said forward support wall providing a front support at a forward angle when diskettes are flipped forward for selection, and said rearward support wall providing a rear support at a rearward angle for display and normal storage of the diskettes;
said forward and rearward support walls having corresponding apertures disposed in the center portions thereof, whereby the access openings of diskettes placed against the forward and rearward support walls coincide with the respective apertures.

4,966,279
BUOYANT RECEPTACLE
Frank H. Pearcy, 4212 Beethoven, St. Louis, Mo. 63116
Filed Dec. 8, 1989, Ser. No. 447,923
Int. Cl.[5] B65D *85/00*
U.S. Cl. 206—315.11 **5 Claims**

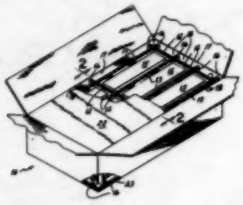
1. A receptacle particularly for toting items on a boat comprising a tote bag having a main body made of cloth having a generally rectangular bottom, upwardly extending sides and ends and a generally rectangular top, the top having an access opening for placement of items in the bag on said bottom, and means for closing the opening, handle means for carrying the bag comprising strapping extending under and across the bottom of the main body of the bag and means for releasably fastening the strapping together above the bag, and means for enabling the bag to float in the event it is dropped into the water comprising a compartment at the bottom of the bag formed of cloth having a generally rectangular bottom corresponding in size and shape to the bottom of the main body, and sides and ends extending up to the sides and ends of the bottom, the upper margins of the sides of the compartment being seamed to the junctures of the sides and bottom of the bag, the strapping extending between the upper margins of the sides of the compartment and said junctures, the upper margins of the ends of the compartment being seamed to the junctures of the ends and bottom of the bag, the bottom of the bag forming the top of the compartment, a generally rigid block of buoyant material in the compartment, said block being rectangular in plan corresponding generally in size and shape to the bottom of the main body of the bag and the bottom of the compartment and having a thickness corresponding generally to the height of the compartment and thereby having a relatively tight fit therein, said block functioning to stiffen the bottom of the main body of the bag and hold it flat, said compartment having an opening through which the block of buoyant material is inserted, and means for closing the opening after insertion of the block.

4,966,280

MULTIPLE-PLY ANTI-STATIC PAPERBOARD

Judson A. Bradford, Holland, Mich., assignor to Bradford Company, Holland, Mich.

Continuation-in-part of Ser. No. 190,044, May 4, 1988. This application Apr. 12, 1989, Ser. No. 336,733
Int. Cl.[5] B65D *81/00*
U.S. Cl. 206—328 21 Claims



1. A container for use with an article which can be damaged by static electricity, comprising:

a box having sidewalls and top and bottom walls;

a plurality of relatively rigid dividers located in said box, each said divider comprising a layer of electrically conductive material sandwiched between, and contacting two layers of an anti-static material, said electrically conductive material having a surface resistivity of less than 10^5 ohms per square inch and said two layers of anti-static material having a surface resistivity of between 10^9 and 10^{14} ohms per square inch; and

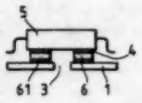
wherein said dividers partially define a predetermined number of cells within said box, each said cell providing protection from both electrostatic discharge and conductive spall for a static electricity sensitive article to be packaged therein.

4,966,281

ELECTRONIC COMPONENT CARRIER

Michirou Kawanishi; Kaoru Aizawa; Kyoichi Araki; Kiyohiro Kamei, and Kunio Nagasaki, all of Osaka, Japan, assignors to Nitto Denko Corporation, Osaka, Japan

Filed Aug. 14, 1989, Ser. No. 393,177
Claims priority, application Japan, Sep. 9, 1988, 63-118999[U]; Sep. 27, 1988, 63-126816[U]; Jan. 13, 1989, 1-2921[U]; Mar. 2, 1989, 1-24581[U]
Int. Cl.[5] B65D *73/02*
U.S. Cl. 206—330 27 Claims



1. An electronic component carrier comprising:

(a) an elongated substrate having a series of electronic component-setting portions spaced from one another at a predetermined interval along the length of said substrate, said substrate having push bar-insertion holes formed therethrough and disposed respectively at said electronic component-setting portions; and

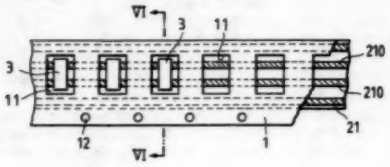
(b) adhesive layers formed respectively on surfaces of said electronic component-setting portions, electronic components being adapted to be bonded respectively to said electronic component-setting portions through said adhesive layers.

4,966,282

ELECTRONIC COMPONENT CARRIER

Michirou Kawanishi; Kaoru Aizawa, and Tatsuo Kurono, all of Osaka, Japan, assignors to Nitto Denko Corporation, Osaka, Japan

Filed Aug. 14, 1989, Ser. No. 393,173
Claims priority, application Japan, Jan. 13, 1989, 1-2920[U]
Int. Cl.[5] B65D *73/02*
U.S. Cl. 206—330 9 Claims



1. An electronic component carrier comprising:

(a) a carrier tape having a series of through holes formed therethrough and spaced from one another at a predetermined interval along the length of said carrier tape; and

(b) an adhesive tape having an adhesive layer by which said adhesive tape is bonded to one side of said carrier tape, said adhesive layer being partially provided with respect to the substrate of said adhesive tape in such a manner that said adhesive layer partially covers each of said through holes;

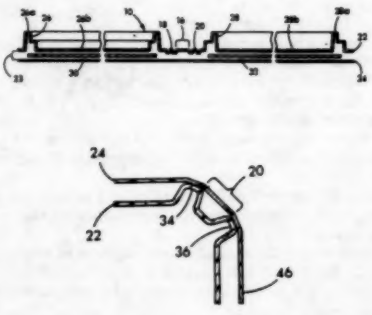
(c) a plurality of electronic components being adapted to be received respectively in said series of through holes and to be bonded to that portion of said adhesive layer partially covering said through holes, thereby holding said electronic components on said carrier tape.

4,966,283

CASSETTE ALBUM WITH CHANNEL-FORM HINGES AND METHOD

Philip K. Sykes, Shoreview, and Stephen R. Schmitz, Shakopee, both of Minn., assignors to Blackbourn Inc, Eden Prairie, Minn.

Filed Nov. 14, 1989, Ser. No. 436,453
Int. Cl.[5] B65D *85/672*
U.S. Cl. 206—387 6 Claims



1. A book-style cassette album comprising, front and rear covers connected by a spine, said album including a stiff, self-supporting thermoformed tray sheet extending the height and breadth of both the front and rear covers and across the spine area, at least one of the covers including a tray comprising a

portion of the tray sheet having an inwardly deflected wall at least in part surrounding a central pocket adapted to receive a cassette or similar article to be held in the album, at least a pair of parallel vertically disposed laterally spaced apart channel-form hinges within the tray sheet, one such hinge at each edge of the spine and extending proximate to the top and bottom edges of the tray sheet to define fold lines between the spine and each of the covers, each of said channel-form hinges being uncompressed such that the tray sheet is of substantially uniform thickness throughout the channel-form hinge and each channel has substantially the same thickness as the surrounding material of the tray sheet, the hinge at each edge of the spine comprises at least a pair of parallel adjacent channels, a cover sheet formed from a soft, supple non-self-supporting sheet of plastic material sealed to at least some of the edges of the tray sheet and being unsealed to the tray sheet at the channel-form hinges, the supple cover stock conforming to the underlying hinges which act as a stiff framework over which the cover sheet extends when the album is closed to present an attractive tailored appearance along each hinge, the cover sheet also having a uniform thickness throughout the hinge area.

4,966,284

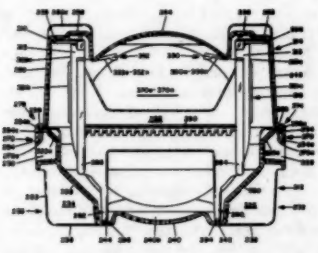
SUBSTRATE PACKAGE

Barry Gregerson, Shorewood, and Larry Dressen, Waconia, both of Minn., assignors to Empak, Inc., Chanhassen, Minn.

Continuation-in-part of Ser. No. 198,464, May 24, 1988, which is a continuation-in-part of Ser. No. 70,435, Jul. 7, 1987, Pat. No. 4,793,488. This application Mar. 31, 1989, Ser. No. 331,291

Int. Cl.[5] B65D *85/57*

U.S. Cl. 206—444 **10 Claims**



1. A sealable contamination proof container package bottom and top for storing and transporting a plurality of wafers, disks or substrates in a wafer carrier comprising:

a. a package bottom including four sides, a continuous vertical surface for tape sealing surrounding the four sides, a lip positional on said vertical surface, opposing hook latches on opposing sides, opposing hand grip recesses on the opposing sides and a raised bottom surface for package stacking; and,

b. a package top including four sides, a continuous vertical surface for tape sealing, and surrounding the four sides, a lip positioned on said vertical surface, opposing hook catches on the opposing side, a top surface including raised stacking surfaces, and two rows of opposing articulated cantilevered horizontal arms with centering V grooves for engaging the wafer and projecting substantially horizontally directly inwardly from said top surface of said package top, disk or substrate positioned on the underside of the top surface at each side of said top surface whereby the package top and bottom halves provide that the wafer carrier mates between the package top and the package bottom with the wafers, disks or substrates in the carrier.

4,966,285

CONTAINER HAVING INDEX SHEET AND RECORDING MEDIUM

Katsumi Otake, and Nobuyuki Iwakami, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

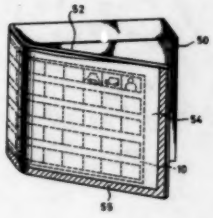
Division of Ser. No. 799,597, Nov. 19, 1985, Pat. No. 4,805,039. This application Mar. 30, 1988, Ser. No. 176,021

Claims priority, application Japan, Nov. 19, 1984, 59-244124; Jul. 16, 1985, 60-107556

The portion of the term of this patent subsequent to Jan. 19, 2005, has been disclaimed.

Int. Cl.[5] B65D *85/30*

U.S. Cl. 206—455 **8 Claims**



1. A package comprising a container, and within the container an image recording medium having a plurality of scenes recorded thereon, the container bearing an index sheet on which are printed a plurality of visible positive images which are at least a part of said plurality of scenes that are recorded on said medium and which are visible when the index sheet is borne by the container, said medium being a photographic medium, and a plurality of sequential numbers printed on said index sheet each juxtaposed with a respective said image, the same number being juxtaposed with the same scene on said photographic medium.

7. A container comprising:

a book-shaped casing having a cover and a containing portion containing a plurality of printed photographs;

a transparent pocket mounted on said cover and containing therein a photographic film having recorded thereon a plurality of scenes from among said printed photographs and an index sheet on which a plurality of scenes recorded on said photographic film are printed in at least one row, said at least one row of scenes being visible when said index sheet is disposed in said transparent pocket.

4,966,286

EASY OPEN FLEXIBLE BAG

Delmar R. Muckenfuhs, Middletown, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 26, 1989, Ser. No. 371,190

Int. Cl.[5] B65D *30/20, 33/08*

U.S. Cl. 206—610 **22 Claims**

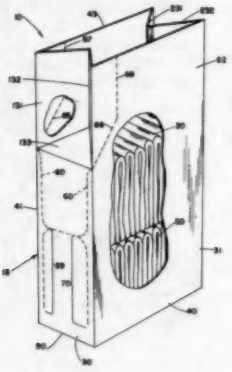
1. An easy open substantially rectangular flexible bag of articles, said articles being arranged in a stack in a direction substantially parallel to their thickness, said bag of articles comprising:

(a) a flexible bag having a front and a back panel connected to one another by means of a pair of side panels, a bottom panel secured about its periphery to said front and back and side panels and a closed uppermost end comprising a pair of inwardly folded side gussets secured between the vertically extending portions of said front and back panels by means of at least one horizontal area of securement;

(b) a stack of articles contained within said flexible bag, said articles being oriented so that the substantially planar surface of said articles is aligned substantially parallel to the side panels of said bag and the outermost peripheral edges of the articles contained within said stack are

aligned substantially parallel to the front and back panels of said bag; and

(c) an easy open device comprising a substantially continuous line of weakness located partially within one of said side panels of said bag and extending into said closed uppermost end of said bag near an innermost end of one of



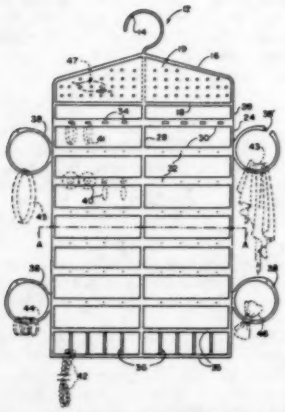
said opposed, inwardly folded side gussets, whereby said easy open bag can be easily opened by at least partially separating a corner portion of said bag from the remainder of said bag by applying tension along said continuous line of weakness, said separation also removing the included portion of said side gusset from the closed uppermost end of said bag during the separation process.

4,966,287

PORTABLE HOLDER AND ORGANIZER FOR JEWELRY AND ACCESSORIES

Rory S. Snyder, 2500 N. Tamiami Trail, Suite 107, Naples, Fla. 33940

Filed Aug. 15, 1989, Ser. No. 393,886
Int. Cl.[5] A47F 7/00
U.S. Cl. 211—13 **10 Claims**



1. A portable holder-organizer for displaying jewelry and accessories comprising an upper section having a hanger hook means extending from a top peak, and a triangular sheet display section,

a lower display frame attached to the upper section comprising at least

two vertically spaced supporting means having a plurality of equally spaced horizontal display strips and at least two horizontal display rods secured thereto,

a plurality of snap rings attached to said vertically spaced supporting means,

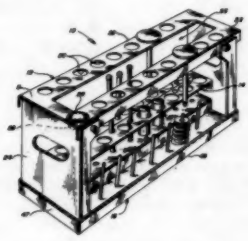
whereby said triangular section has miniature openings therein for holding pin items, said display strips having a plurality of miniature openings therein for holding earrings, said display rods capable of holding necklaces and said snap rings capable of holding jewelry and accessories.

4,966,288

VALVE TRAIN ORGANIZER

Paul W. Kirkham, 16550 Madison St., NE., Ham Lake, Minn. 55304

Filed Aug. 22, 1988, Ser. No. 234,934
Int. Cl.[5] A47F 7/00
U.S. Cl. 211—60.1 **38 Claims**



1. A valve train component holding and organizing device, comprising,

a. a valve rack, the rack having a valve support portion, the support portion including a plurality of regularly spaced valve retaining means;

b. an interior portion, the interior portion having a first spring retaining level including a plurality of valve spring retaining means, and a second level secured to the first level and held at a height above the first level, and the second level secured to the first level wherein the second level does not overhang the first level, the second level having a plurality of alternating lifter retaining means and push rod retaining means extending there along; and

c. means for releasably holding the interior portion and the valve rack together, and the valve rack being held below the valve suspending rack.

4,966,289

SERIES OF PERIPHERAL APPARATUSES FOR RAIL TYPE OF DRAFTING TABLE

Long-Cing Lin, 2th Fl., 39, Alley 9, Lane 385, Ching Ping Rd., Chung Ho City, Taipei Hsien, Taiwan

Filed Nov. 28, 1988, Ser. No. 276,942
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—69.5 **6 Claims**

1. In combination with a tiltable drafting table having an upwardly-facing drafting surface, a front edge, a rear edge, and two side edges: the improvement comprising an elongated rail (1) oriented an appreciable distance above the drafting surface parallel to the table side edges; said rail having a rear end spaced above the table rear edge, and a front end spaced above the table front edge;

a slide structure (17) carried the rear end of the rail for traversing movements along the table rear edge; a roller frame means (18) carried at the front end of the rail for traversing movements along the table front edge, such that the rail is movable over the drafting surface in a direction parallel to the table front and rear edges;

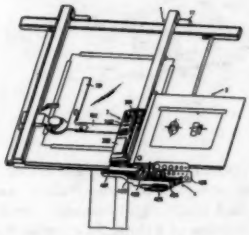
a base (19) slidably positioned on said rail for movement

therealong; said base having a front edge, a rear edge, and two side edges;

a manually-operable brake means (16) carried on said base for frictional contact with the rail to adjustable lock the base in selected positions along the length of the rail;

an upwardly facing storage tray (3) supported on said base between its front and rear edges;

and an instrument tray (4) extending forwardly from said base;



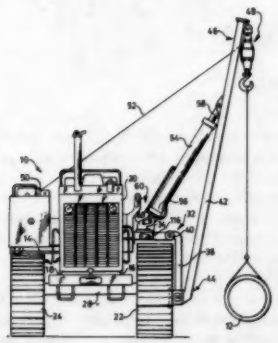
said instrument tray having a rear edge thereof swingably connected to the front edge of the base for adjusting movements of the instrument tray around a horizontal swing axis paralleling the base from edge, such that the instrument tray can assume a horizontal position when the drafting table surface is inclined in a front-to-rear direction.

4,966,290

VEHICLE FOR MANIPULATING PIPE

Henry Ejchler, East Peoria, and Derrell G. Jones, Washington, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Oct. 12, 1989, Ser. No. 420,500
Int. Cl.[5] B66C *23/26*
U.S. Cl. 212—258 **12 Claims**



11. A method of preparing a pipelaying track-type vehicle for transportation, said vehicle having a main frame assembly, a pipelayer frame a pipe supporting boom arm, a support member, a retaining pin assembly securing said support member to said pipelayer frame, a fluid powered cylinder connected to said boom arm and to said support member, a first bracket assembly secured to said main frame assembly, and a second bracket assembly secured to said fluid powered cylinder, said method comprising the steps of:

removing said boom arm from said vehicle, including disconnecting said boom arm from said pipelayer frame and disconnecting said fluid powered cylinder from said boom arm;

removing said retaining pin assembly from said pipelayer frame and said support member;

rotating said support member and said fluid powered cylinder to a position where said second bracket assembly engages said first bracket assembly; and

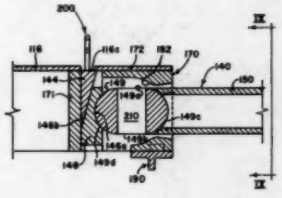
inserting said retaining pin assembly through said first and second bracket assemblies.

4,966,291

SLACKLESS ROTARY DRAWBAR ASSEMBLY

Mary A. Glover, Pittsburgh, Pa., assignor to McConway & Torley Corporation, Pittsburgh, Pa.

Filed Aug. 18, 1989, Ser. No. 395,960
Int. Cl.[5] B61G *9/00*
U.S. Cl. 213—71 **7 Claims**



1. A slackless rotary drawbar coupler assembly for a railway car having a center sill, said assembly comprising:

a drawbar having a shank portion extending to an enlarged truncated spherical butt end portion defining essentially convex spherical buff and draft load bearing surfaces, the shank portion projecting from said convex spherical draft load bearing surface;

housing means secured to said center sill for supporting said butt end portion therein, said housing means having a top wall, a rear wall and spaced side walls, said housing means further having an essentially entirely open bottom portion;

concave surface means formed on said housing means and bearing against said convex spherical draft load bearing surface for transferring draft loads therefrom to said center sill;

a rear support block having a tapered rear surface and a truncated concave substantially spherical buff load bearing surface adapted to engage with the convex buff load bearing surface of said butt end portion;

a gravity activated slack adjusting wedge for engaging the tapered surface of said rear support block;

a detachable bottom support casting mounted to said center sill for retaining said butt end portion within said housing means, said bottom support casting having concave surface means formed thereon which are alignable with said concave surface means formed on said housing means in order to provide a continuous concave surface which bears against the convex spherical draft load bearing surface for transferring draft loads from the convex spherical draft load bearing surface to said center sill; and

means for detachably securing said bottom support casting to said center sill.

4,966,292

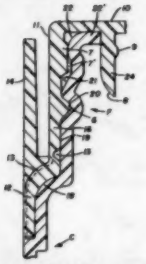
CAP AND NECK FINISH FOR A WIDE MOUTH CONTAINER

Michael Marino, New Castle, Pa., assignor to West Penn Plastics, Inc., New Castle, Pa.

Filed Oct. 23, 1989, Ser. No. 424,916
Int. Cl.[5] B65D *17/40*
U.S. Cl. 215—256 **5 Claims**

1. A cap and neck finish for a wide mouth container comprising in combination a container neck having a cap receiving

finish, said finish formed with a cylindrical upper end having an outer surface including a convex outer surface and an inturned flange extending therefrom, a flat outer surface immediately below said convex outer surface, an outwardly and downwardly angled outer surface therebelow, an annular groove in said outer surface immediately below said outwardly and downwardly angled outer surface, a vertical smooth surface below said annular groove and an outturned and downturned outer surface therebelow joining said container; and a deformable flexible plastic cap, said cap having a top portion having a depending annular flange on its peripheral edge and a depending annular sealing flange inwardly thereof, the space between said depending annular flange and said depending annular sealing flange being such that said convex outer surface of said neck finish and its inturned flange 22' are sealingly engaged in said cap when positioned therein, a flattened rib on the inner surface of said depending annular flange of said cap



for sealing engagement with said convex outer surface of said neck finish, several circumferentially spaced inturned rib sections on said flattened rib positioned for engagement with said flat outer surface immediately below said convex outer surface of said neck finish and an inturned cross sectionally curved rib on the inner surface of said depending annular flange therebelow for fastening registry in said annular groove is said neck finish and an area of weakness in said depending annular flange above said curved rib extending therearound on a first horizontal line and a portion of said area of weakness being spaced below said horizontal area of weakness and communicating therewith so as to form a downturned tab configuration; a lower annular outwardly offset secondary flange defining the lower portion of said downturned annular flange for registry with said outturned and downturned outer surface of said neck finish; an upstanding pull tab on said secondary flange; an upward extending weakened area in said secondary flange adjacent said upstanding pull tab.

4,966,293

TRANSPORT AND/OR STORAGE CONTAINER FOR LIQUIDS AND FINELY DIVIDED BULK SOLIDS

Pierre Pfeiffer, Drulingen; Benoit Cheval, Saverne, and Paul Sigwalt, Drulingen, all of France, assignors to Sotralentz S.A., Drulingen, France

Filed Oct. 6, 1989, Ser. No. 417,965

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834280

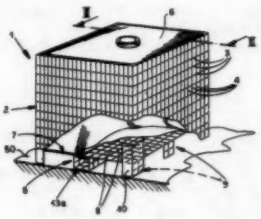
Int. Cl.[5] B65D *87/00*

U.S. Cl. 220—1.5 **20 Claims**

1. A transport and storage container for a flowable material, comprising:

an outer support structure having at least one lateral wall and composed of a gridwork of interconnected vertical and horizontal bars;

a pallet-forming platform spanning said support structure, adapted to be engaged by a forklift truck or other stacking, lifting or shifting apparatus and having support surfaces on which said container can rest, said platform being composed of a gridwork of mutually crossing interconnected bars defining a bottom grid, the gridwork of said platform having downwardly bent portions supporting said bottom grid at a predetermined spacing above said surfaces, said vertical bars extending downwardly below said bottom grid substantially to a region of said surfaces and being connected to said portions; and



an internal vessel of a plastic enclosed in said support structure and having flexible walls resting against and supported by said bottom grid and said lateral wall at least upon introduction of a flowable material into said vessel.

4,966,294

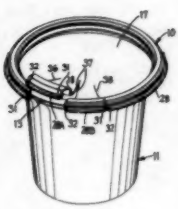
TAMPER-EVIDENT CLOSURE FOR WIDE MOUTH CONTAINER

Anthony C. Mack, Kalamazoo, and Robin M. Robbins, Portage, both of Mich., assignors to Fabri-Kal Corporation, Kalamazoo, Mich.

Filed Jan. 16, 1990, Ser. No. 464,976

Int. Cl.[5] B65D *43/08*

U.S. Cl. 220—266 **13 Claims**



1. A tamper-evident closure for a wide mouth container having a top rim presenting a radially outwardly projecting lip thereon, said closure comprising:

a closure member having a size to cover the open top of the container when applied thereto, said closure member having a central panel and a downwardly opening rim cavity encircling said central panel and adapted to receive therein the top rim of the container, said rim cavity being defined by a pair of upstanding radially spaced skirt segments connected at their respective upper edges by a top rim segment, a radially outer one of said skirt segments having adjacent a lower edge thereof a radially inwardly projecting and circumferentially extending first flange adapted to snugly fit under and frictionally engage the lip on the container, and a plurality of circumferentially spaced, radially outwardly projecting second flanges, each contiguous with and oriented below said first flange;

a plurality of generally inverted V-shaped, radially outwardly projecting, rim segments integrally connected between each set of mutually adjacent circumferential ends of said second flanges, said inverted V-shaped rim segments each having a pair of wall segments each projecting radially outwardly from a respective one of said mutually adjacent circumferential ends of at least said second flanges, said pair of walls extending inclined up-

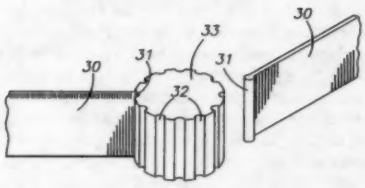
wardly from at least said second flanges toward each other to an integral connection thereof forming an apex, said apex defining a stress concentration means for the material of said closure member such that a lifting force applied to one of said plural second flanges will cause the material of said closure member to break only at said apexes located at opposite circumferential ends of said second flanges to which said lifting force has been applied to allow for continued tearing of said material of said closure member.

4,966,295

DIETING PLATE ARRANGEMENT WITH MOVABLE PARTITIONS

Carolyn L. Parrish, 608 Arrington, Diboll, Tex. 75941

Filed Aug. 11, 1989, Ser. No. 392,409
Int. Cl.[5] B65D *25/06*
U.S. Cl. 220—22.3 **4 Claims**



1. A dieting plate arrangement comprising,

a receptacle including a planar floor, a continuous wall directed upwardly from said floor and integrally formed thereto terminating at its upper end and a planar rim extending outwardly of the wall, and

a divider including a plurality of partition walls to define a plurality of compartments within the container wherein the compartments are of varying and predetermined volumetric capacities, and

wherein at least one of the compartments is formed with a plurality of volumetric gradations formed upon an interior surface of the wall to provide further indication of varying volumes of foods within the at least one compartments, and

wherein the divider is removably mounted within the receptacle, and

wherein each partition wall of the divider is pivotally mounted at an intersection defined by a junction of the partition walls to enable repositioning of the partition walls relative to one another to form compartments of varying capacities, and

wherein each partition wall is movably mounted relative to the divider, and

wherein the divider includes a central cylindrical hub, the cylindrical hub includes a series of cylindrical recesses formed within an outer wall of the hub, each of the recesses axially aligned relative to an axis of the hub, and each cylindrical recess formed of a complementary configuration relative to a cylindrical terminal end formed at each forward terminal end of each partition wall to selectively accommodate the partition walls about the hub.

4,966,296

INTEGRATED FOOD TRAY WITH INDIVIDUAL SEPARABLE FOOD CONTAINERS FOR HEATING AND COOLING FOOD

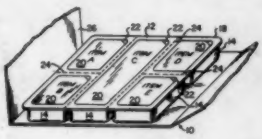
Leslie A. Farrell, 9365 N. Perry St., Westminster, Colo. 80030

Filed Mar. 22, 1989, Ser. No. 326,922
Int. Cl.[5] A47G *19/32*
U.S. Cl. 220—23.4 **6 Claims**

1. An integrated food receptacle for heating and cooling, or for maintaining at ambient condition, separate meal course portions, said food receptacle comprising:

a receptacle housing;

at least two meal course portion containers integrally connected to said receptacle housing, wherein at least one of said meal course portion containers is composed of heat resistant material selected from the group consisting of microwave-safe material and conventional oven safe and compatible material, and wherein further t least one of



said meal course portion containers is composed of material selected from the group consisting of freezer, refrigerator, and ambient temperature safe and compatible material; and

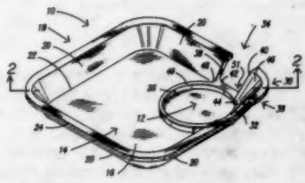
means for releasing at least one of said integrally connected meal course portion containers from said receptacle housing, and as necessary from each other meal course portion container; whereby each said separate released meal course portion container may be heated, or cooled, or maintained at ambient conditions, as desired.

4,966,297

FOOD AND BEVERAGE SNACK TRAY

Robert W. Doty, 536 N. Spoonbill Dr., Sarasota, Fla. 33577

Continuation of Ser. No. 383,175, Jul. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 328,107, Mar. 23, 1989, abandoned, which is a continuation-in-part of Ser. No. 250,146, Sep. 28, 1988. This application Feb. 14, 1990, Ser. No. 480,139
Int. Cl.[5] A47G *23/06*
U.S. Cl. 220—23.83 **9 Claims**



1. A food and beverage snack tray comprising a tray bottom having a peripheral side wall including a plurality of side wall portions terminating in an upper side wall surface extending upwardly from said tray bottom, said tray bottom including a beverage container receptacle and food receiving area separated by a separator element and a tray grasping means including a grasping element extending upwardly from said tray bottom adjacent said peripheral side wall, said grasping element comprising a pair of substantially straight grasping edges each disposed in substantially the same plane as the plane of the corresponding side wall portions adjacent each said substantially straight grasping edge terminating in an upper grasping surface, said upper grasping surface disposed in spaced relationships relative to said upper side wall surface, said upper grasping surface being disposed at least as high as the adjacent upper side wall surface such that a user may simultaneously grasp said grasping element between the thumb and index finger and a beverage container disposed within said beverage

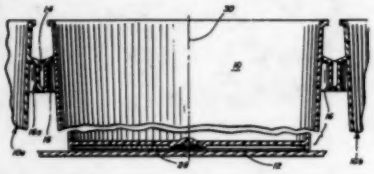
container receptacle adjacent said grasping element with said grasping element resting in the space between the thumb and index finger of the user's hand to hold the food and beverage snack tray in one hand.

4,966,298

LOCKING CONTAINER CONNECTOR SYSTEM

John W. Von Holdt, 6864 Lexington La., Niles, Ill. 60648

Filed Mar. 25, 1988, Ser. No. 173,569
Int. Cl.[5] B65D *21/02*
U.S. Cl. 220—23.4 **12 Claims**



1. In a molded container made of substantially flexible material, the improvement comprising in combination:

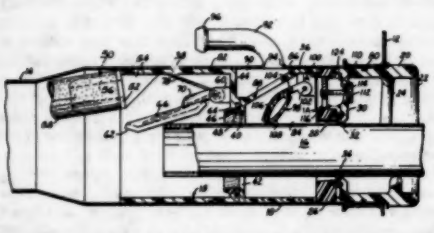
an integrally molded component of said container comprising a circumferentially extending array of longitudinally extending teeth which are spaced from each other by recesses of a shape proportioned to receive identically-shaped teeth of an adjacent container of similar shape, said recess each defining a radially recessed bottom surface and said teeth each defining a radially projecting top surface; said container also defining a circumferential flange substantially continuously extending across one longitudinal end of each of said teeth, said flange defining an outermost circumferentially extending surface which occupies a radial level which is between the radial levels of the bottom surfaces and the top surfaces, whereby the interengaging teeth and recesses of said container and another, identical container cannot move longitudinally, said teeth each defining in cross section a generally arrow-head-shaped, transversely enlarged, radially outer portion relative to a radially inner portion, said portions being proportioned to permit snap-fit, locking engagement of a tooth of said container between a pair of teeth of said adjacent container of similar shape.

4,966,299

FUEL ASSEMBLY HAVING A VAPOR VENT WITH A HINGED FLOAT VALVE

Michael R. Teets, Grosse Pointe Park; Keith A. Kerby, Clarkston; Michael P. Rafferty, Warren; Wayne D. Carver, Pontiac, and Robert Shrodes, Jr., Mt. Clemens, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Jul. 11, 1989, Ser. No. 378,567
Int. Cl.[5] B01D *53/02*
U.S. Cl. 220—85 VR **2 Claims**



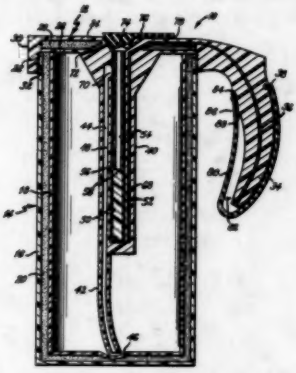
1. For a vehicle fuel tank having a tubular, open ended inlet structure and defining an interior, an improved fuel filler assembly which is configured to be insertably assembled into the tubular, open ended inlet structure, the fuel filler assembly being so configured to isolate the fuel tank interior from atmosphere before and during a filling operation during which an elongated nozzle of a liquid fuel delivery apparatus is inserted into the fuel filler assembly, comprising: the fuel filler assembly including a plurality of generally tubular housing members within the open ended, tubular inlet structure and arranged in end to end relationship with one another, a first and outer housing member having an axially directed opening therethrough sufficient to allow passage of the elongated nozzle therethrough; a second housing member positioned inwardly from the first housing member in the tubular, open ended inlet structure and having an axially directed opening therethrough corresponding to and adjacent with the opening in the first housing member and sufficient to allow passage of the elongate nozzle therethrough; an annularly shaped seal member between the first and second housing members and having a radially inwardly directed edge adapted to slidingly engage the elongated nozzle as it is inserted into the fuel filler assembly during a fuel delivery operation, the contact by the seal edge with the elongated nozzle providing a good seal to prevent fluid leakage from the interior of the fuel tank to atmosphere; a third housing member positioned inwardly from the second housing member in the tubular, open ended inlet structure and having an axially directed aperture therethrough significantly larger than the elongated nozzle to form an annular fluid flow passage to permit the flow of any fluid therebetween which is displaced from the fuel tank interior as liquid fuel is delivered therein by the elongated nozzle, the aperture in the third housing member being axially spaced from the adjacent openings in the first and second housing members whereby an interior space is formed therebetween; the third housing member having a wall portion extending both radially and axially to separate the interior space into an inner chamber communicated directly to the annular fluid flow passage and an outer chamber within the tubular, open ended inlet structure; means connected to the outer chamber to receive fluid; the wall portion having a vapor flow aperture therethrough interconnecting the inner and outer chambers; valve means normally positioned downwardly and away from the vapor flow aperture to permit vapor flow from the fuel tank interior and inner chamber into the outer chamber and then to the fluid receiving means, the valve means including hinge means between the valve means and the third housing member to pivotally guide movement of the valve means against gravity from the downward and open position to an upward and close position which prohibits flow of fluid through the vapor flow aperture to the receiving means; the valve means being sufficiently lighter than liquid fuel so that liquid fuel engaging the valve means causes it to pivot upwardly to the closed position; a fourth housing member positioned inwardly from the third housing member and having an axially directed aperture corresponding and aligned with the aperture in the third member; an annularly shaped end seal member spaced about and away from the elongated nozzle so as to preserve the annular flow passage about the elongated nozzle; a closure member normally extending in a radial direction when in a closed position in sealing relation to the end seal member thus prohibiting communication between the fuel tank interior and the inner chamber, the closure member being pivotally supported by the fourth housing member to permit its movement away from the end seal member toward a more axially oriented direction by insertion of the elongated nozzle through the apertures of the third and fourth housing members whereby fuel vapor and air from the fuel tank interior may flow to the fluid receiving means but liquid fuel is prevented from passing the pivotal valve means.

4,966,300

INSULATED DRINKING CONTAINER

Robert A. Coonradt, 8851 Vamo Rd., Sarasota, Fla. 34231

Filed Mar. 21, 1990, Ser. No. 496,863
Int. Cl.[5] A47G 19/22
U.S. Cl. 220—90.2 10 Claims



1. An insulated drinking container comprising:
an insulated cup having an open upper end;
an insulated lid lockably engagable onto said cup upper end whereby liquid may be sealed within said cup;
said lid having an integrally formed handle for grasping and a centrally positioned, elongated, downwardly disposed straw housing;
said straw housing having a stationary straw extending downwardly to the bottom of said cup;
a removable straw closed at its lower end and slidably mountable in said straw housing for up and down movement in response to air pressure within said straw housing, said removable straw having a first position wherein said movable straw is downwardly positioned within said straw housing for storage and a second position wherein said movable straw is upwardly positioned out of an aperture formed in said lid for sipping;
said removable straw having an aperture through a mid point of its wall in fluid communication with the upper end of said stationary straw when said removable straw is in its second position whereby liquid in said container may be withdrawn by sipping the upper end of said removable straw;
means for selectively air pressurizing said straw housing at the lower end of said removable straw whereby said removable straw is urged into its second position.

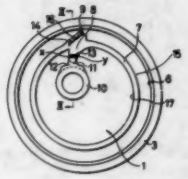
4,966,301

CONTAINER WITH AN EASY OPEN TYPE CLOSURE

Yuji Yamashita; Koji Kobayashi, both of Iwatsuki; Keisuke Shimizu, Houya, and Koji Maekawa, Kawagoe, all of Japan, assignors to Hokkai Can Co., Ltd., Tokyo, Japan

Filed Jun. 20, 1986, Ser. No. 876,402
Claims priority, application Japan, Jun. 20, 1985, 60-133067
Int. Cl.[5] B65D 17/34
U.S. Cl. 220—270 28 Claims

1. A container with an easy open-type closure comprising:
a closure member made of at least a metallic foil sheet for being affixed together with a ring-shaped member on an opening end portion of a container barrel and
a strip-shaped pull-opening member fixed through an adhesive agent layer to a top surface of said closure, said pull-opening member being fixed to said top surface of said closure more firmly than the tearing strength of said closure, and said pull-opening member having a pulling tab, having an outside guide edge directed towards an opening edge of said ring-shaped member, and extending as long as at least one-half of a circle of said opening edge of said ring-shaped member,
wherein said adhesive agent layer comprises a resinous compound selected from the group consisting of (1) a



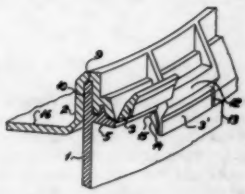
copolymer resin of an olefin and an α,β-unsaturated carboxylic acid containing from 0.01 to 0.5% by weight of a phenol series antioxidant and (2) an ionomer resin containing from 0.01 to 0.5% by weight of a phenol series antioxidant.

4,966,302

SNAP LOCKING DEVICE FOR A CONTAINER WITH A COVER

Jorgen Hjordie, Kalundborg, Denmark, assignor to Lagan Plast AB, Ljungby, Sweden

PCT No. PCT/DK87/00142, § 371 Date Sep. 22, 1988, § 102(e) Date Sep. 22, 1988, PCT Pub. No. WO88/03901, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 20, 1987, Ser. No. 222,077
Claims priority, application Denmark, Nov. 21, 1986, 5579/86
Int. Cl.[5] B65D 41/16
U.S. Cl. 220—306 4 Claims



1. A snap locking device for a container with a cover, said cover being lockable to the container, said device comprising a flange which is formed on the cover, said flange being movable between a loosened and a locked position and is adapted to cooperate with a locking edge on the container, said flange, which is thus bistable, being formed with substantially vertical weakened lines, wherein said flange portions disposed between at least two weakened lines are exteriorly provided with wall reinforcements, said wall reinforcements extending axially over the bistable flange and over a stationary cover flange disposed in extension of said flange.

4,966,303

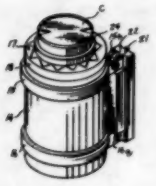
INSULATED BEVERAGE CONTAINER SECUREMENT APPARATUS

August C. Jones, Rte. 3, Box 193, Eufaula, Okla. 74432

Filed Aug. 7, 1989, Ser. No. 390,975
Int. Cl.[5] B65D 25/14
U.S. Cl. 220—411 8 Claims

1. A beverage container securement apparatus comprising, a sleeve member, and a clamp means for surroundingly securing the sleeve member, and a handle member, said handle member

including separate fastener means for securement of said handle member to said clamp means, and



further including an insulating cup-shaped receptacle, said cup-shaped receptacle slidingly received within said sleeve member, said sleeve member formed as an elongate cylindrical sleeve formed of semi-rigid material.

4,966,304

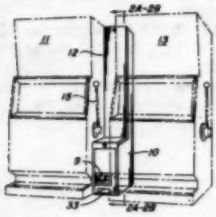
BILL MONEY CHANGER FOR SLOT MACHINES

Edward C. Kelly, Blue Bell, Pa., assignor to Lambda-Beta-Epsilon Group, Hatfield, Pa.

Filed Feb. 23, 1989, Ser. No. 314,132

Int. Cl.[5] G07D *1/04, 7/00*; G07F *17/34*

U.S. Cl. 221—6 **13 Claims**



1. A bill money changer and gambling machines, comprising:

a. a plurality of gambling machines located on a support platform, each machine separated by a narrow space;

b. a bill-activated coin dispenser supported by said platform and located between adjacent gambling machines in said narrow space, said bill money changer being separate from and unattached to said gambling machines;

c. a cabinet enclosing said bill money changer, including a displaceable closure which provides frontal access to the inside of said cabinet and a coin storage area therein;

d. a plurality of separate coin storage cartridges, each cartridge being individually removable from said bill money changer through said displaceable closure; and

e. a shoe for receiving coins from each of said cartridges, said shoe being selectively movable between locations beneath each cartridge.

4,966,305

TABLET DISPENSER

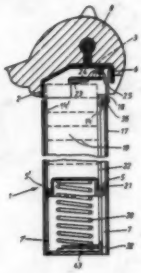
Ignaz Hinterreiter, St. Valentin, Austria, assignor to Centromint Company Establishment, Vaduz, Liechtenstein

Filed Sep. 6, 1988, Ser. No. 240,598

Int. Cl.[5] B65D *83/04*

U.S. Cl. 221—229 **8 Claims**

1. A tablet dispenser which has a sleeve and a magazine for holding the tablet stack, which magazine is guided in the sleeve and has an essentially U-shaped cross-section and a base connecting its limbs and, for filling purposes, can be pushed partially out of the sleeve against the force of a spring arranged between the base of the magazine and a cup-like slide that is displaceable in the magazine and in the sleeve and acts as a plate spring, the slide being guided in the magazine to prevent complete tilting in the magazine and being provided with lateral projections, one of which passes through a slot arranged in a web of the magazine and engages a groove running in the longitudinal direction of the sleeve and the other of which engages another longitudinal groove of the sleeve, which longitudinal grooves are at least partially closed at the push-out end of the sleeve and form stops for the projections of the slide, wherein the projection (5) of the slide (21), that passes



through the slot (22) of the magazine (18) is provided with a hammer-head (40); a pin stop (43) is arranged close to the base of the magazine (18) on the latter and engages between two coils of the spring (20); and a base (50, 50') of each groove (7, 7') of the sleeve (17) which holds a projection (5, 5') of the slide (21) slopes upward in the region of its push-out end, so that the internal distance between the opposite bases (50, 50') of the grooves decreases toward the end of each groove (7, 7').

4,966,306

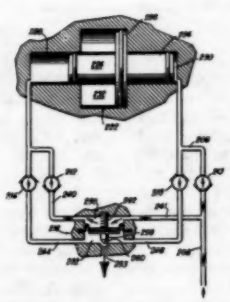
BEVERAGE DISPENSER SYSTEM USING VOLUMETRIC RATIO CONTROL DEVICE

William S. Credle, Jr., Stone Mountain; Arthur G. Rudick, Marietta, and George J. Jarocki, Atlanta, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 888,546, Jul. 18, 1986, abandoned, and a continuation-in-part of Ser. No. 24,933, Mar. 12, 1987, Pat. No. 4,779,761, which is a continuation-in-part of Ser. No. 925,426, Oct. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 924,381, Oct. 29, 1986, abandoned. This application Oct. 24, 1988, Ser. No. 261,876 The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.

Int. Cl.[5] B67D *5/56*

U.S. Cl. 222—1 **10 Claims**



1. A method for dispensing a postmix beverage comprising a mixture of concentrate and water comprising the steps of:

(a) providing a compact beverage dispensing valve for mix-

ing together a quantity of water and concentrate in a pre-determined and controlled ratio and for dispensing the mixture therefrom;

(b) providing a compact multi-cycle, dual acting, reciprocating volumetric ratio control device inside of said valve to control the ratio of water to concentrate dispensed from said dispensing valve, said device being moved by the pressure of said water and said device operating through a plurality of reciprocating cycles for each cup of beverage dispensed; and

(c) providing four check valves to control the flow of concentrate to and from said device and pressurizing the outlet line from said device to the pressure of the inlet line to said device plus an additional pressure, to prevent pressurized concentrate from blowing through said check valves and through said device.

4,966,307

INTEGRATED MULTIFUNCTION REGULATOR STATION FOR GAS SUPPLY TO A SECONDARY MAINS

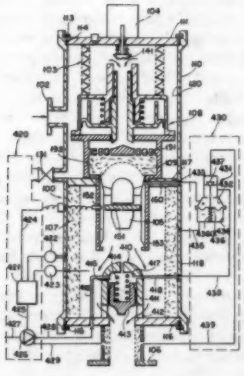
Jean-Philippe Cornil, Houilles, France, assignor to Gaz de France, Paris, France

Filed Apr. 5, 1989, Ser. No. 334,693

Claims priority, application France, Apr. 14, 1988, 88 04961

Int. Cl.[5] B67B *7/24*

U.S. Cl. 222—3 **16 Claims**



1. Integrated multifunction regulator station for gas supply to a secondary user mains running off a principal distribution mains, comprising a single external housing designed so as to withstand an operating pressure and providing accommodation for at least a filter, a pressure regulator and a safety valve, said single external housing having an essentially cylindrical lateral wall, first and second bulkheads mounted on the end portions of the cylindrical wall, a transversal separating and supporting wall lying substantially parallel to the first and second bulkheads and disposed inside the single external body to define first and second chambers, the single external housing being fitted with an entrance flange joined to an input valve and defining an input orifice which leads into said first chamber and an output flange joined to an output valve and defining an output orifice communicating with said second chamber, characterized in that it further comprises a flow meter mounted on said transversal wall, in that said filter is formed by a cylindrical cartridge between the first bulkhead and the pressure regulator, which is itself mounted on said transversal wall, and in that the safety valve is mounted on the first bulkhead and contains a safety valve head located upstream of the pressure regulator, at a top of the latter, and inside the cylindrically shaped cartridge.

4,966,308

DOUBLE PISTON COLORANT DISPENSER

Atis Strazdins, Unanderra, Australia, assignor to Strazdins (International) Pty. Limited, Sydney, Australia

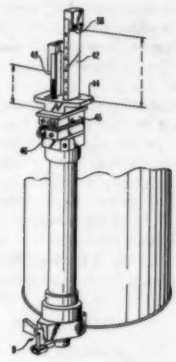
Filed Jun. 27, 1988, Ser. No. 211,743

Claims priority, application Australia, Jun. 24, 1987, PI2662

The portion of the term of this patent subsequent to Oct. 23, 2007, has been disclaimed.

Int. Cl.[5] B65D *5/08*; G01F *11/04*

U.S. Cl. 222—43 **1 Claim**



1. A liquid dispenser comprising;

a housing;

an inlet to the housing;

an outlet from said housing;

a valve operably connected to said housing and being operable such that whenever in a first position said inlet is opened while at the same time said outlet is closed and whenever in a second position said inlet is closed while at the same time said outlet is opened;

a first variable stroke piston, moveable within said housing, so as to draw liquid into said housing when said valve is in its first position and to force liquid out of said housing when said valve is in its second position;

a bore located within said first piston;

a second variable stroke piston moveable along said bore with or independently of said first piston and can draw liquid into said bore when moved independently of said first piston and said valve is in its first position and to force liquid in said bore out of said outlet of said housing when said valve is in its second position,

said housing is generally tubular with a first adjustable gauge extending into said housing and adapted to be set such that reproducible quantities of liquid can be dispensed from said housing and a second adjustable gauge extending into said housing such that reproducible quantities of liquid of smaller quantities then the first quantities of liquid can be discharged by said second piston,

said first and second gauges are elongated and have holes located on one arm of each gauge, which are engageable by a respective pin located on a respective first and second releasable locking means, to position each gauge at a desired measure,

said first piston comprises a hollow elongated shaft defining said bore, and said first locking means is secured to said dispenser housing, and comprises:

an outer shell able to move relative to said housing with said pin fixedly connected to said shell;

a spring means located between said housing and said shell and being opposite to the pin to bias said pin into engagement with a required hole in the first gauge, whereby when said shell is moved against said spring means said pin is withdrawn from engagement with a respective hole to

allow movement of said first gauge parallel to a longitudinal axis of said dispenser housing;

said second piston has an elongated shaft ending through the hollow of said hollow shaft of said first piston and said second locking means comprises:

a second locking means housing positioned above said dispenser housing and through which slidably passes said first and second gauges with said hollow shaft fixedly secured to said locking housing with the elongated shaft of said second piston extending beyond said second locking means;

a second locking means outer shell surrounding said second locking means housing and able to move relative to said second locking means housing with said pin of said second locking means fixedly connected to said second locking means shell; and

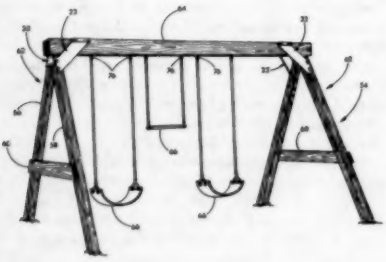
a spring means located between said second locking means housing and said second locking means shell and being opposite to said pin of said second locking means to bias said pin into engagement with a required hole in said second gauge, whereby second locking means shell is moved against said spring means of second locking means so that said second locking means pin is withdrawn from engagement with a respective hole of said second gauge to allow movement of the latter parallel to the longitudinal axis of said dispenser housing and second locking means housing.

4,966,309

PLAY STRUCTURE HARDWARE KIT

Thomas R. Baer, Edgerton, Wis., assignor to Newco of Janesville, Inc., Janesville, Wis.

Filed Aug. 7, 1989, Ser. No. 390,634
Int. Cl.[5] A63G *9/00*
U.S. Cl. 272—85 **6 Claims**



1. A kit for assembling timber and fasteners into a play structure comprising:

(a) at least one frame bracket having a frame segment joined at substantially a right angle to a beam segment, wherein the brackets have portions defining at least four nail holes in the frame segment and at least two nail holes in the beam segment, and wherein the beam segment has portions defining a bolt hole, the frame bracket being adapted to joining an A-frame to a beam;

(b) at least one frame brace having a body and a flange rigidly joined to the body at such an angle that when the body is placed flat on the A-frame, the flange lies flat on the beam; wherein the flange and the body each have portions defining at least two nail holes and at least two bolt holes; and

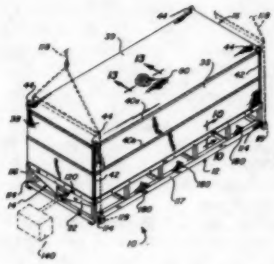
(c) at least one beam clamp having portions defining at least two nail holes and a central bolt hole, the bolt hole being of a dimension adequate to receive a bolt therethrough as does the bolt hole in the frame bracket, the clamp being adapted to attachment across the laminiations of a laminated beam so as to restrict the separating of the laminations.

4,966,310

COLLAPSIBLE STORAGE CONTAINER AND METHOD FOR STORING MATTER

Gerald P. Hawkins, 6987 Robb St., Arvada, Colo. 80004

Filed Dec. 1, 1988, Ser. No. 278,592
Int. Cl.[5] B65D *35/56*
U.S. Cl. 222—105 **13 Claims**



1. A sealable collapsible storage module comprising:

a body having a rigid bottom portion and a collapsible upper portion, said collapsible upper portion being made from a sheet of flexible material, said upper portion also being sealably attached to said bottom portion so as to define a sealable storage chamber for storing of matter, said body also defining at least one sealable port in communication with said storage chamber through which said matter is conveyable, said sheet of flexible material being sufficiently flexible to enable said collapsible upper portion to collapse under the action of gravity when said port is vented to ambient atmosphere; and

a plurality of generally horizontally disposed internal support lines extending across said internal chamber wherein each support line has opposite ends which are attached to opposing surfaces of said flexible upper portion, said plurality of support lines providing internal support for said flexible upper portion to prevent said upper portion from rupturing when said storage chamber of said body is filled with matter.

13. A method for storing matter comprising the steps of:

providing a sealable, collapsible storage module having a collapsible body defining a storage chamber for storing matter, said body being made from a sheet of flexible material, said body also defining at least one sealable port in communication with the storage chamber, said sheet of flexible material being sufficiently flexible to enable said body to collapse under the action of gravity when said port is vented to ambient atmosphere, said module also including generally horizontally disposed internal support means for preventing said body from rupturing when said storage chamber of said body is filled with matter;

raising the collapsible body so that matter can be fed into said storage chamber;

filling said storage chamber with matter by feeding matter into said storage chamber through said sealable port;

evacuating air from said storage chamber so that pressure within said chamber is negative with respect to ambient pressure;

pressurizing said storage chamber with a desired gaseous atmosphere until the pressure within said chamber is positive with respect to ambient pressure; and

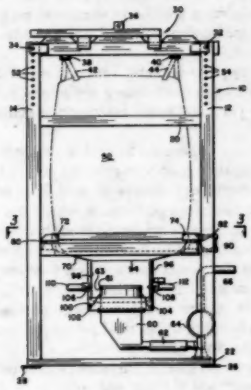
sealing said body to maintain the matter stored in said chamber under the positively pressurized gaseous atmosphere.

4,966,311

BULK BAG EMPTYING APPARATUS AND METHOD

Murland L. Taylor, Rte. 4, Box 296-A, Parsons, Kans. 67357

Filed Nov. 29, 1988, Ser. No. 277,588
Int. Cl.[5] B65D 35/56
U.S. Cl. 222—105 1 Claim



1. Apparatus to empty a material filled bulk bag of the type having a top, an outer liner, and having a bottom discharge spout normally closed by a releasable tie-off cord, said apparatus comprising:

an essentially vertical support frame means,

a hoistable frame means removably positionable at the top of said frame;

said hoistable frame means including means to support said bulk bag within said frame;

a unitary support pan intermediately positioned within said frame to receive said bottom of said bag, said support pan tapering downwardly to a central opening;

means to vibrate said support pan;

a material receiving and conveying conduit coaxially spaced below said central opening, said conduit having dual flanges around its top;

a cylindrical sleeve attached to the bottom of said pan, said sleeve extending downwardly and coaxial about said central opening forming an annular space about said conduit, said sleeve having an access opening about a portion of its periphery;

means to withdraw air from said annular space;

drawcord means operable between said dual flanges to releasably and sealably attach the bottom end of said inner liner discharge spout to said material receiving conduit; and

dual fluid actuated piston/cylinders attached to said sleeve adjacent said access opening, means on each said piston to releasably receive one end of said drawcord means.

4,966,312

DISPOSABLE ORAL LIQUID MEASURE DISPENSER

Donald A. Waring, 17997 Oak Leaf La., Yorba Linda, Calif. 92686

Filed Dec. 6, 1988, Ser. No. 280,672
Int. Cl.[5] A61J 7/00; A61M 5/178; B65D 37/00; B67D 5/38
U.S. Cl. 222—209 12 Claims

1. A one-piece dispensing container for transporting and dispensing through a bottom wall of said dispensing container, a measured amount of liquid or semiliquid, without dripping, said dispensing container being symmetrically shaped about a first longitudinally disposed medial plane and comprising:

(a) a generally cylindrically shaped, hollow upper neck section having an upper mouth opening adapted to receive liquid contents and to receive a cap sealable to said neck section,

(b) a generally cylindrically shaped, hollow bellows section extending downwards from said neck section, said bellows section being formed of a flexible material and having formed in its cylindrical wall surface a plurality of annular rings disposed at regular longitudinal intervals, and a plurality of annular indentations disposed at regular longitudinal intervals alternating with said annular rings,

(c) an elongated hollow reservoir section extending downwards from a bottom ring of said bellows section, at least a lower portion of said reservoir section being generally semi-cylindrically shaped, an outer side wall of said reservoir section being substantially longitudinally aligned with the outer annular wall of said bottom ring of said bellows section, the inner side wall of said reservoir section being located proximate a second longitudinally disposed medial plane perpendicular to said first medial plane, the front and rear side walls of an upper portion of said reservoir connected to the inner and outer walls and defining a front-to-rear thickness dimension of said reservoir section upper portion of said reservoir section, said dimension being approximately half the diameter of said bellows section to permit the upper portion of said reservoir section to be grasped between two fingers, the lower surfaces of the fingers resting on the bottom surface of the bottom bellows ring, and

(d) a hollow dispensing tube section located laterally adjacent said reservoir section extending downwards from said bellows section, said dispensing tube having the general shape of an inverted hollow U-tube, said U-tube having an upwardly extending inner leg communicating at its lower end in fluid-tight connection with said lower portion of said reservoir section, and a downwardly extending, outer outlet leg having a bore through which fluid may be dispensed, said dispensing tube section being of smaller front-to-rear thickness than the diameter of said bellows section to permit said dispensing tube section to be grasped between two fingers, the lower surfaces of the fingers resting on the bottom surface of the bottom bellows ring, whereby said dispensing container may be transported and operated in one hand.

4,966,313

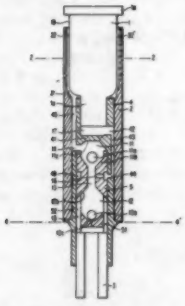
DEVICE ENABLING A SPRAY VALVE TO BE USED IN ANY POSITION

Jean-Pierre Lina, Neubourg, France, assignor to Societe Anonyme dite : VALOIS, Le Neubourg, France

Filed Feb. 27, 1989, Ser. No. 315,658
Claims priority, application France, Feb. 26, 1988, 88 02351
Int. Cl.[5] B65D 83/14
U.S. Cl. 222—402.19 6 Claims

1. A device for enabling an aerosol valve designed to be crimped in the neck of a can to operate both upsidedown and the rightway up, said device being designed to be placed be-

tween the inlet end fitting of the valve and a dip tube, and comprising two chambers in series and aligned on the axis of the valve, said chambers being interconnected by a channel having an opening into each of said chambers, said channel also being in communication with the suction zone of the valve, each chamber including a gravity-operated non-return valve member for engaging the corresponding channel opening, each non-return valve member occupying a closed position when the corresponding channel opening is in the bottom of the corresponding chamber, the chamber which is closer to



the valve also being in communication with a zone outside the valve and close to the valve via the end of the chamber which is opposite to its channel opening and the chamber which is further from the valve also being in communication with said dip tube via its end which is opposite to its channel opening, wherein said device comprises three generally tubular parts mounted concentrically, namely: an outer sleeve suitable for receiving the valve body; a tubular part for engaging on the inlet end fitting of the valve; and a central bush including said channel and defining said chambers in conjunction with said tubular part.

4,966,314

SELF-SEALING REFRACTORY PARTS OF A REGULATING DEVICE FOR REGULATING THE FLOW OF MOLTEN METAL FROM A METALLURGICAL VESSEL

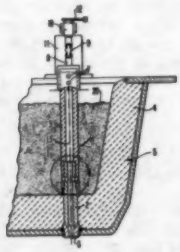
Raimund Brückner, Nidernhausen, and José Gimpera, Wiesbaden, both of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Aug. 2, 1989, Ser. No. 388,473

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1988, 3826245

Int. Cl.[5] B22D *41/08*

U.S. Cl. 222—598 **19 Claims**



1. A regulating device of a metallurgical vessel for regulating the flow of molten metal from the vessel, said device comprising:

a fixed refractory part fixedly secured to the metallurgical vessel so as to be immovable relative thereto, said fixed refractory part defining a first cylindrical peripheral surface of the device;

a movable refractory part rotatably, slidably or both rotatably and slidably mounted to the metallurgical vessel so as to be rotatable, slidable or both rotatable and slidable relative to said fixed refractory part, said movable refractory part defining a second cylindrical peripheral surface of the device confronting said first cylindrical peripheral surface;

said refractory parts defining a molten metal discharge passage open to the confronting peripheral surfaces of said refractory parts and to the exterior of metallurgical vessel; and

actuating means connected to said movable refractory part for rotating, sliding or both rotating and sliding said movable refractory part relative to said fixed refractory part between a discharge position at which the molten metal discharge passage communicates with the interior of the metallurgical vessel to facilitate the discharge of molten metal from the vessel and a sealed position at which the flow of molten metal from the metallurgical vessel through the molten metal discharge passage is restricted by the confronting cylindrical peripheral surfaces defined by said refractory parts,

said cylindrical peripheral surfaces of said refractory parts being spaced apart from one another a predetermined distance at room temperature so as to define an annular gap therebetween having a predetermined width at room temperature, and

each of said refractory parts having a coefficient of thermal expansion which, when said device is subjected to a predetermined high temperature substantially above room temperature, causes a reduction in said predetermined width of the annular gap to a degree which establishes a clearance fit at said gap between said peripheral surfaces that is effective to prevent a molten metal having a temperature at said predetermined high temperature from penetrating between said surfaces at said gap while allowing said movable refractory part to be moved between said discharge and sealed positions by said actuating means.

4,966,315

REFRACTORY PLATE ASSEMBLY FOR A THREE-PLATE SLIDING CLOSURE UNIT

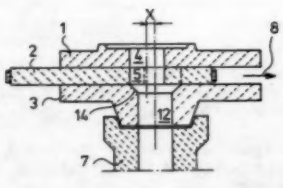
Bernhard Tinnes, Zollikerberg, and Walter Vetterli, Winterthur, both of Switzerland, assignors to Metacon AG, Zurich, Switzerland

Filed Aug. 29, 1989, Ser. No. 400,056

Claims priority, application European Pat. Off., Aug. 31, 1988, 88114176

Int. Cl.[5] B22D *41/08*

U.S. Cl. 222—600 **8 Claims**



1. In an assembly of refractory plates for use in a three-plate sliding closure unit for controlling the discharge of molten metal from a metallurgical vessel, said assembly including an inlet stationary refractory plate having therethrough an outlet opening to receive molten metal from the metallurgical vessel, an outlet stationary refractory plate having therethrough an

outlet opening and fixedly positioned relative to said inlet stationary refractory plate, and a movable refractory plate mounted between said inlet and outlet stationary plates and having an outlet opening, said movable plate being slidable relative to said inlet and outlet stationary plates between a closed position, whereat said outlet opening of said movable plate is blocked from communication with said outlet openings of said inlet and outlet stationary plates, a completely open position, whereat said outlet opening of said movable plate is completely open to communication with said outlet openings of said inlet and outlet stationary plates, thereby defining a discharge channel for the discharge of molten metal, and throttled positions between said closed and open positions, whereat said outlet opening in said movable plate is partially in communication with said outlet opening in said inlet stationary plate, thereby restricting the cross-sectional area of said discharge channel and controlling the discharge of the molten metal, said movable plate being movable in a closing direction from said open position to said closed position, and said outlet opening in said outlet stationary plate enabling complete draining of molten metal within said outlet opening in said movable plate during movement of said movable plate in said closing direction to said closed position, the improvement wherein:

the axis of said outlet opening in said outlet stationary plate is offset in said closing direction from the axis of said outlet opening in said inlet stationary plate; and

the inlet end of said outlet opening in said outlet stationary plate is widened.

4,966,316

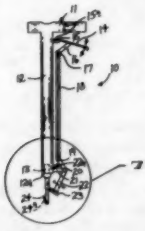
SHOE HORN AND CANE APPARATUS

Curtis L. George, and Sandra L. George, both of P.O. Box 1421, Safety Harbor, Fla. 34695

Filed Dec. 29, 1989, Ser. No. 459,201

Int. Cl.[5] A47G *25/82*; A45B *1/00, 3/00, 9/02*

U.S. Cl. 223—119 **5 Claims**



1. A shoe horn and cane apparatus comprising, in combination,

a handle member, and

an elongate shaft including an upper end integrally mounted to the handle, and

the shaft including a lower end including a securement portion formed in the interior of said shaft, and

an elongate cane tip and an elongate shoe horn each selectively securable to the securement portion, and

a link means cooperative with the handle for pivotment of a lower terminal end of the link means below the securement portion, and

an engagement member mounted to the lower terminal end of the link means for cooperation with a rear surface of the shoe horn.

4,966,317

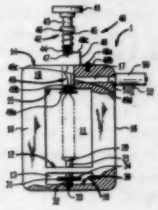
DEVICE FOR DISPENSATION OF COMPRESSED GAS

Phillip Barr, 618 E. 82nd St., Brooklyn, N.Y. 11236

Filed Jun. 28, 1989, Ser. No. 373,189

Int. Cl.[5] B67B *7/49*

U.S. Cl. 222—5 **5 Claims**



1. A portable compressed gas dispensation device for use with a small cylinder of compressed gas, said dispensation device comprising a support frame having a first cavity formed at the central portion of said frame and a second cavity formed in said frame below said central cavity; a cylinder punch assembly disposed in the top portion of said frame, said punch assembly extending from the top wall of said support frame to said central cavity, said cylinder punch assembly comprising an engagement arm and an engagement sleeve, said engagement arm including a knob and a downwardly-extending cylindrical portion, said cylindrical portion having a peripheral recession formed proximate to said knob and threads formed at its distal end, said engagement arm further including a needle integrally formed with an extending from its distal end, said needle providing means to puncture the cylinder of compressed gas used in conjunction with the present device, said engagement sleeve including a sleeve rim formed at its distal end to facilitate sealingly engagement of said sleeve with the top wall of said first cavity of said support frame, said sleeve further including sleeve threads formed in tis inner wall adjacent to sleeve rim, said sleeve threads being complimentarily formed with the threads formed with the threads formed at the distal end of the engagement arm for threadedly attachment thereto, said sleeve still further including a slotted opening formed in the walls thereof above said sleeve threads, said opening providing communication means with the chamber formed in the top portion of said frame; an adjustable cylinder table disposed within said first cavity; cylinder adjustment means disposed within said second cavity and integrally constructed with said cylinder table; and a trigger-operated nozzle disposed to one side of said support frame, said nozzle communicating with the cylinder punch assembly by means of a chamber formed within said support frame.

4,966,318

SHOPPING ORGANIZER DEVICE

Charlotte Dutka, 154 Primrose La., Bricktown, N.J. 08724

Filed Mar. 10, 1989, Ser. No. 321,586

Int. Cl.[5] B60R *11/00*; A45C *11/34*

U.S. Cl. 224—42.46 R **6 Claims**

1. A shopping organizer device for use in combination with a shopping cart having an elongate handle, a top basket positioned adjacent said handle and to an upper rear end of said cart, said device comprising,

a receptacle including a rigid forward wall, a rigid rear wall including an exterior surface, and intercommunicating flexible side walls and a floor,

the forward wall including an exterior face and a free upper edge, and

a rigid lid defined by exterior surface overlying an interior surface and including a rear edge spaced from a forward edge, the lid pivotally mounted to said rear wall at the rear edge of said lid including a flap pivotally mounted to the

forward edge of said lid, said flap including an interior surface, and

a plurality of divider members positioned in said receptacle wherein each divider member of said plurality of divider members include an upwardly extending tab, each tab including a forward face, and

a latch member secured to the interior surface of said flap cooperative with a further latch member positioned on an exterior face of said forward wall, and

positioning means formed on said forward wall cooperating with further positioning means formed on an interior surface of said lid adjacent said flap for alignment of said lid relative to said forward wall, and

securement means mounted on an exterior surface of the rear wall for selective securement to the shopping cart, and

wherein each of said plurality of divider members is of a height substantially equal to that of the side walls, and the upwardly extending tab is of a first height, and

wherein said positioning means include a plurality of spaced abutment members, each abutment member of a predetermined thickness and integrally formed and coplanar with said forward wall extending upwardly from the upper edge of the forward wall wherein the abutment member is of a height equal to the first height, and

wherein the lid includes a plurality of spaced further latch members fixedly secured to the interior surface of the lid adjacent the flap, and

wherein each of the further latch members includes a pair of spaced ears, each ear pair of the spaced ears defines a first and second ear spaced apart a distance substantially equal to the predetermined thickness of an abutment member, and each ear of said pair of spaced ears is of a length substantially equal to the first height, and the ear is arranged on the interior surface of the lid for receiving the abutment member therewithin each respective pair of spaced ears when the lid is in a downward first position.

4,966,319

ORTHODONTAL DEVICE CARRYING CASE WITH NECK STRAP

Jim Fleming, Kleinburg, Canada, assignor to Jim Fleming Communications, Kleinburg, Canada

Filed Nov. 2, 1989, Ser. No. 430,592
Int. Cl.[5] A45C *13/30*; A61C *19/02*
U.S. Cl. 224—207 **2 Claims**

1. An orthodontal device carrying case to be hung downwardly from one's neck, said case comprising a plastic body formed by a first body portion having an interior region for receiving the orthodontal device and a second body portion for closing with said first body portion and covering the orthodontal device, a hinge between said first and second body portions at one end of said case, and a releaseable closure at the other end of said device, eyelets for receiving a neck strap to hang said case, said eyelets being provided on said first body portion in balanced positions to either side of said releaseable closure substantially diametrically opposite said hinge, said second body portion being provided with an external indicia

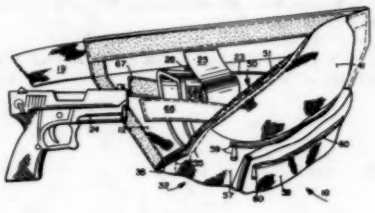
receiving depression with identifying information regarding said carrying case.

4,966,320

SIMULATED POUCH WITH INTERIOR, CONCEALED HOLSTER

Eugene DeSantis, 149 Denton Ave., New Hyde Park, N.Y. 11040, and Mitchell Bloom, New Hyde Park, N.Y., assignors to Eugene DeSantis, New Hyde Park, N.Y.

Filed Nov. 13, 1989, Ser. No. 435,172
Int. Cl.[5] A45C *1/04*
U.S. Cl. 224—229.000 **20 Claims**



1. A simulated carrying pouch assembly, comprising:

a backing having a top, bottom, and two ends;

a flap having a top, bottom, and two ends, with a central portion between the top, bottom, and two ends, an excess of material forming the flap central portion so that the central portion of the flap defines a container adapted to stand out from the backing;

readily releasable fastener means attaching said flap top and ends to said backing top and ends, respectively so that upon detachment of said flap top and ends from said backing said flap drapes downwardly and said backing is readily accessible;

means for attaching said flap bottom to said backing bottom;

means for mounting said backing on a wearer;

means for mounting a holster, capable of holding a hand gun, on said backing completely within the area defined by said top, bottom, and ends thereof, and within the container defined by said flap when said flap top, bottom, and ends are in engagement with said backing top, bottom, and ends; and

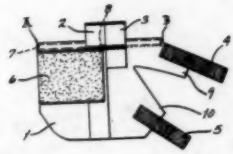
a holster adapted to be mounted by said holster mounting means.

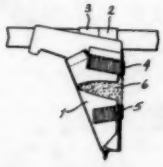
4,966,321

ADJUSTABLE HOLSTER FOR PISTOL TYPE POWER TOOLS

Wade S. Outlaw, 2633A Wyoming St., St. Louis, Mo. 63118

Filed Jul. 6, 1989, Ser. No. 376,366
Int. Cl.[5] A45F 5/00
U.S. Cl. 224—253 **3 Claims**





1. A holster for holding an object comprising:

a piece of flexible sheet material having a top, bottom and two sides;

a plurality of protruding flaps formed as part of said sheet material and extending outwardly from one of said two sides;

said plurality of protruding flaps including at least an upper protruding flap and a lower protruding flap;

a plurality of adjustable straps to individually correspond with each said protruding flap, said straps being attached to said flaps and extending in the same general direction as said flaps, said straps having a portion extending beyond said flap and having a first releasable securing means on said portion;

said plurality of adjustable straps including at least an upper adjustable strap and a lower adjustable strap;

second releasable securing means attached to the other side of said sheet material;

means attached to said sheet material for supporting the holster on a user;

whereby said sheet material is adapted to be generally planar until said sheet material is wrapped around said object and said flaps are individually adjusted around the object and secured to the other side by connection of said first and second securing means thereby forming a pocket for the object.

4,966,322

HOLDER FOR SKI GOGGLES

Joseph Zagorski, and Robin J. Zagorski, both of 355 Marquesa Dr., Coral Gables, Fla. 33156

Filed Oct. 30, 1989, Ser. No. 428,940
Int. Cl.[5] A45F 5/00
U.S. Cl. 224—267 **2 Claims**

1. A holder for ski goggles comprising an elastic band to engage the upper portion of the arm of a user, a first buckle having a central bar and a first passageway on one side of said central bar and a second passageway on the other side of said central bar, a second buckle, one end of said elastic band being passed through the first and second passageways on said first buckle, through said second buckle and being secured to the central bar on said first buckle, the opposite end of said elastic band being secured to said second buckle whereby the length of the elastic band may be adjusted by sliding said first buckle along the length of the elastic band, an elongated strap secured to said elastic band adjacent said second buckle with the longitudinal axis of the strap extending at right angles with respect to the longitudinal axis of the elastic band and Velcro fastening means disposed on said strap whereby said elastic band may be

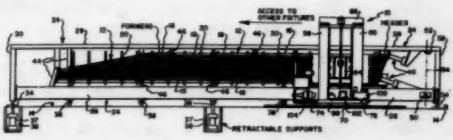
passed around the upper portion of the arm of a user and retained in place with tension by adjusting the length of the elastic band and subsequently placing ski goggles against the elastic band over said elongated strap with said Velcro fastening means retaining the ski goggles on the upper portion of the arm of a user.

4,966,323

FIVE AXIS RIVETER AND SYSTEM

Thomas H. Speller, Sr., Buffalo, N.Y.; John W. Davera, Antioch, Tenn.; Jeffrey P. Weaver, Tonawanda, and Mark J. Andrews, Niagara Falls, both of N.Y., assignors to Gemcor Engineering Corp., Buffalo, N.Y.

Division of Ser. No. 129,929, Dec. 2, 1987, Pat. No. 4,864,702.
This application Aug. 9, 1989, Ser. No. 391,794
Int. Cl.[5] B21J 15/14, 15/30
U.S. Cl. 227—51 **10 Claims**



1. In an automatic fastening machine for operation on an elongated workpiece supported generally vertically with respect to a substantially horizontal supporting surface, said machine including a frame having a pair of sides adapted to move along said workpiece by operative engagement between a pair of wheels on each of said sides and spaced-apart substantially parallel track means extending along said workpiece and over said supporting surface, the improvement comprising:

flexible supporting means for one of said wheels carried by said frame and operatively connected to said one wheel whereby all four of said wheels carry an equal load despite

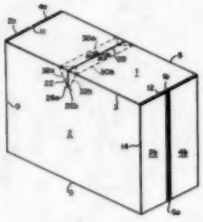
any slight misalignment of said track means in a vertical direction.

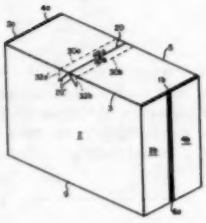
4,966,324

INTEGRAL CARRYING HANDLE FOR A CAN CARTON AND CARTON BLANK CONTAINING SAME

Thomas C. Steel, 45 Ogston Ter., Malverne, N.Y. 11565

Filed Dec. 21, 1989, Ser. No. 454,520
Int. Cl.[5] B65D *5/46*
U.S. Cl. 229—117.13 **32 Claims**





1. A carrying handle or a carton for packaging a plurality of cans and having interconnected top, bottom and side walls, and end closure panels, said handle comprising:

a transverse slit extending completely across one of said interconnected carton walls and having end projections extending into the two walls interconnected with said one of said carton walls; and

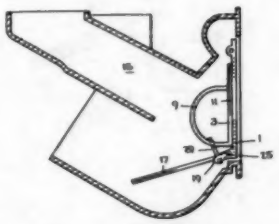
a transverse fold line extending completely across said one of said interconnected carton walls which is spaced from and disposed generally parallel to said transverse slit, said fold line having end projections extending into said two walls interconnected with said one of said carton walls which terminate adjacent to the corresponding end projection of said transverse slit, so that said transverse fold line and said transverse slit cooperatively define therebetween a foldable transverse handle flap struck from said one of said interconnected carton walls and said two walls interconnected therewith, foldably joined thereto via said fold line, said transverse handle flap having a main central portion which is foldable inwardly to an angle of approximately 180°, into face contacting relation with the inner surface of said one of said interconnected carton walls and two outer end portions which flex inwardly to substantially tangentially wrap the end of an adjacent can disposed within the carton when said associated handle flap is inwardly folded.

4,966,325

CHANGE RETURN PROTECTION DEVICE

Salvatore Anello, Box 313, Tackers Corner Rd., and Nathan Turk, Rocking Horse Ranch, Rte. 44–55, both of Highland, N.Y. 12528

Filed Nov. 22, 1988, Ser. No. 275,074
Int. Cl.[5] B65G *11/04*
U.S. Cl. 232—57.5 **14 Claims**



1. A change return protection device for installation on the back side of a door to a coin return box connected to a coin return passage of a coin-operated machine, comprising:

a blocking flap shaped to span the full width of said coin return passage and which will not block the passage to prevent coins from falling past said blocking flap to be retrieved;

a press fit pin fixing said blocking flap to said door; and

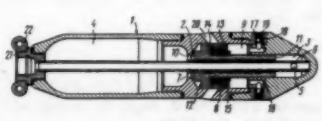
a roughly P-shaped sealing plate, the flat back portion of said sealing plate constituting an attachment area, the rounded portion of said sealing plate constituting a sealing projection, said sealing plate being properly dimensioned so that when rigidly attached to said door and said door is opened to allow a user to remove a returned coin said sealing projection seals off said coin return passage, but will allow coins to fall freely into the coin return box when the door is closed.

4,966,326

AIR-BLASTING CARTRIDGE

Leonid G. Slez, Makeeva, and Jury I. Tjurin, Zhdanov, both of U.S.S.R., assignors to Makeevsky Inzhenrno-Stroitelny Institut, Makeevka, U.S.S.R.

PCT No. PCT/SU87/00116, § 371 Date Feb. 22, 1989, § 102(e) Date Feb. 22, 1989, PCT Pub. No. WO88/10159, PCT Pub. Date Dec. 29, 1988
PCT Filed Oct. 21, 1987, Ser. No. 328,588
Claims priority, application U.S.S.R., Jun. 23, 1987, 4263106
Int. Cl.[5] G05B *1/08*
U.S. Cl. 239—99 **4 Claims**



1. An air-blasting cartridge, comprising housing (1) subdivided, by a piston (2) arranged lengthwise a longitudinal axis thereof, into an inlet chamber (3) communicating with a source of compressed air through an air admission tube (6) which runs through an axial port of said piston (2), and a discharge chamber (4), communicating with the inlet chamber (3) through an annular gap (7) between said air admission tube (6) and said piston (2) and adapted to communicate with the surrounding atmosphere at the instant of its discharge characterized in that the area of the end surface (10) of said piston (2) that faces said discharge chamber (4) is greater than the area of the end sur-

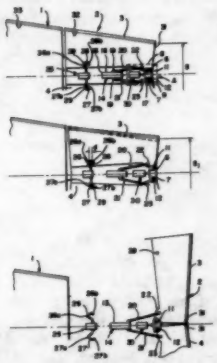
face (11) of said piston (2) that faces paid inlet chamber (3) but is smaller than the area of the end surface (12) of a collar (8) on said piston (2) that faces said discharge chamber (4), said collar forming, together with said housing (1), an additional chamber (9) on the side facing said inlet chamber (3).

4,966,327

JET ENGINE PROVIDED WITH A THRUST REVERSER

Etienne Fage, Ramatuelle, and Jean-Pierre Lair, Plaisance, both of France, assignors to The Dee Howard Company, San Antonio, Tex.

Filed Oct. 27, 1988, Ser. No. 263,224
Int. Cl.[5] F02K *1/10, 1/12*
U.S. Cl. 239—265.29 **19 Claims**



13. An engine operable in both a direct thrust mode and a thrust reversing mode and having at least two thrust reverser doors movable between a stowed position corresponding to said direct thrust mode of the engine and a deployed position corresponding to said thrust reversing mode, said doors forming a nozzle throat of the engine when said doors are in their stowed position, comprising:

means for pivoting, without translational movement, said thrust reverser doors to said deployed position for thrust reversing in said thrust reversing mode about at least corresponding first pivot centers substantially at a longitudinal plane of the nozzle throat;

means independent from said pivoting means for shifting said first pivot centers to corresponding second pivot centers substantially at the plane of the nozzle throat to vary the distance between respective ends of said doors along an axis transverse to the longitudinal axis of the engine to thereby change the cross-sectional area of the nozzle throat while said doors remain in their stowed position in said direct thrust mode.

4,966,328

MICROSPRAYERS FOR USE IN IRRIGATION

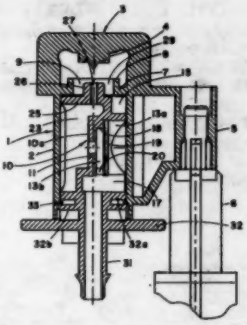
Avraham Neeman, Karkur, Israel, assignor to Dan Mamtirim, Galil Elyon, Israel

Filed Oct. 25, 1989, Ser. No. 426,354
Claims priority, application Israel, Aug. 28, 1989, 91450
Int. Cl.[5] B05B *1/26, 1/30*; A01G *25/16*
U.S. Cl. 239—524 **4 Claims**

1. A microsprayer comprising in combination a substantially cylindrical housing open at a first end thereof and having a spray directing boss formed integrally therewith and adjacent to a second and opposite end thereof; an insert body adapted to be press fitted within said housing and comprising a longitudinally directed wall portion, first and second flanges extending respectively from opposite sides of said wall portion so as to bear sealingly against an inner surface of said housing so as to define therewith respective inlet and outlet chambers;

a flexible membrane so located in said inlet chamber as to divide it into first and second sub-chambers;

water inlet means formed in a first end wall of said insert body adjacent said first end of the housing and communicating with said first sub-chamber;



a communicating aperture formed in said wall portion and serving to effect communication between said second sub-chamber and said outlet chamber; and

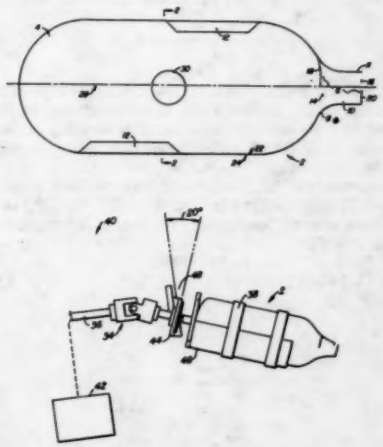
a second end wall of said insert body adjacent said second end of said housing and formed with a spray outlet aligned with and adjacent to said spray directing boss.

4,966,329

PREDATOR MITE AND BENEFICIAL INSECT FIELD APPLICATOR

Edgar D. Shaw, Watsonville, Calif., assignor to Driscoll Strawberry Associates, Inc., Watsonville, Calif.

Filed Apr. 13, 1989, Ser. No. 337,597
Int. Cl.[5] A01C *1/00*; B65B *37/00*
U.S. Cl. 239—650 **39 Claims**



1. An applicator for distributing a mixture of particulate material, the applicator comprising:

a container having first and second ends and an opening formed at the first end of said container;

a neck disposed at said first end of said container and extending outwardly therefrom, said neck including a dispensing port in communication with said opening;

a first flow restrictor disposed towards said opening; and

a second flow restrictor disposed within said neck towards said dispensing port;

wherein said opening and said dispensing port are concentrically aligned and wherein said first and second flow restrictors are misaligned.

4,966,330

APPARATUS IN A POWDER SPRAYER

Ingemar Loof, Fabriksgatan, Sweden, assignor to AC Greiff Ytbehandling AB, Nacka, Sweden

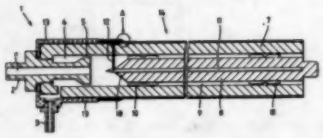
PCT No. PCT/SE88/00198, § 371 Date Nov. 16, 1989, § 102(e) Date Nov. 16, 1989, PCT Pub. No. WO88/08336, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 18, 1988, Ser. No. 424,260

Claims priority, application Sweden, Apr. 28, 1987, 871775

Int. Cl.[5] B05B *5/047*

U.S. Cl. 239—690 8 Claims



1. An apparatus in a powder sprayer comprising an annular friction charging channel (9) defined by an inner, longitudinal body (8) and an outer, tubular body (7) surrounding the inner body, there being disposed, in the flow path of the powder through the sprayer, at least one turbulator (10) with turbulence members (21) which are obliquely inclined or helically configurated in relation to the longitudinal direction of the sprayer said turbulence members being shaped as substantially radially extending vanes spaced along the circumference of the annular channel, characterised in that at least two turbulators (10) are disposed in the annular channel (9); and that the annular channel (9) has a bigger radial extent immediately upstream and downstream of a turbulator (10) and within the area of the turbulator than is the case at remaining portions of the annular channel.

4,966,331

STIRRED BALL MILL FOR GRINDING PIGMENTS

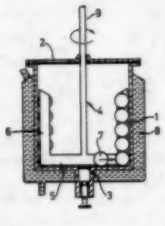
Manfred Maier, Ludwigshafen; Manfred Mielke, Heidelberg, and Peter Hauser, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 130,960, Dec. 10, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,114

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642330

Int. Cl.[5] B02C *17/16*

U.S. Cl. 241—172 3 Claims



1. A stirred ball mill for grinding, in particular dry grinding, pigments, comprising a stationary cylindrical container containing grinding balls and equipped with an inlet for the material to be ground and an outlet for the ground material, and a drivable stirrer arranged for rotation about the axis of the container,

wherein the active surfaces of the stirrer are in the form of webs carried at the ends of radial arms, said webs lying in planes including said axis and being thin compared to their extent in a direction radially of said axis, in which direction they extend in closely spaced, non-touching relationship to, the inner wall of said container so as to act as impellers for the grinding balls, the spacing of said webs from said inner wall being small compared with the diameter of said balls;

wherein the stirrer has a shaft; and

wherein said radial arms, together with said webs, are in the form of a plurality of paddlelike stirrer elements which are disposed along the stirrer shaft and the container circumference in a staggered arrangement and whose stirring surfaces are in an overlap arrangement.

4,966,332

MEAT CHOPPER

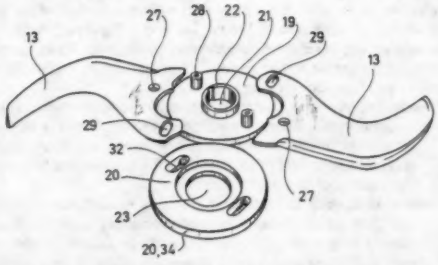
Herbert Laska, Linz, Austria, assignor to Maschinenfabrik Laska Gesellschaft m.b.H., Austria

Filed Oct. 21, 1988, Ser. No. 261,054

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1987, 3735651

Int. Cl.[5] B02C *18/16*

U.S. Cl. 241—199.7 21 Claims



1. A meat chopper comprising a round pan (1), said pan having a circular cross section and which can be rotated in an essentially horizontal plane; at least one cutter head (10), which is attached in a non-rotatable and axially immovable manner to an essentially horizontal, rotatable shaft (11), said cutter head having at least one cutter head unit (12); said cutter head unit having a base disk (19) having a through-hole mounting said base disk on said shaft, at least one adjusting disk (20) having a through-hole for mounting said adjusting disk on said shaft and which can be adjusted by rotating with respect to the base disk; and at least two cutter (13) having outer ends interacting with the wall of the round pan, said cutters disposed axially and radially between said disks, each of said cutters movable about a respective pivot disposed between said disks whereby pivotal movement of said cutter regulates the distance of said cutter outer end from said pan wall and said cutters connected to said adjusting disk by means of a follower device (26), whose spacing is determined by the respective pivot; said adjusting disk (20) being positively locked to the base disk (19) by means of at least one locking device (31) which can be operated from the outside.

4,966,333

METHOD OF CONTROLLING TENSION IN A YARN SHEET DURING WINDING

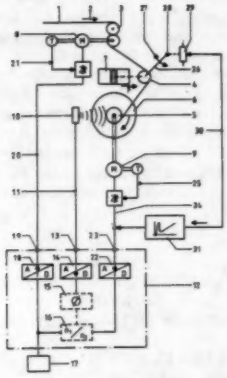
Bernd Bosch, Monchengladbach, Fed. Rep. of Germany, assignor to Gebruder Sucker & Franz Muller GmbH & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,876

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1987, 3734433

Int. Cl.[5] B65H *59/00*

U.S. Cl. 242—75.51 2 Claims



1. A method of controlling tension in a plurality of yarns during delivery in the form of a sheet successively from a driven delivery roller, peripherally about a movable dancer roller, and onto a driven winding core, said method comprising the steps of biasing said dancer roller toward peripheral engagement with the yarn sheet and driving said delivery roller and said winding core at different circumferential speeds to tension the yarn sheet, controlling the driven speed of said delivery roller according to a predetermined control program, ultrasonically determining the actual diameter of the yarn sheet wound on said winding core, producing a primary analog correcting signal representing the yarn sheet diameter, adjusting the driven speed of said winding core in relation to said primary analog correcting signal, detecting movements of said dancer roller, producing a supplementary proportional-plus-integral-plus-derivative correcting signal representing detected movements of said dancer roller, said supplementary correcting signal being derived proportionally, integrally and derivatiely from the detected movements of said dancer roller, and adjusting said primary analog correcting signal as a function of said supplementary correcting signal for fine adjusting of the driven speed of said winding core.

4,966,334

CABLE REEL

Hiroyuki Bannai, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,996

Claims priority, application Japan, Apr. 18, 1988, 63-50845[U]

Int. Cl.[5] H01R *35/00*

U.S. Cl. 242—85 4 Claims

1. A cable reel of the type for installation on a rotating mechanism comprising:

a fixed housing;

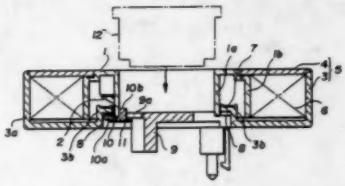
a movable housing rotatably mounted on said fixed housing and defining a space therebetween;

a strip cable flexibly wound and received between said space to electrically connect said fixed housing and said movable housing;

an engaging portion formed along a circumferential line of said fixed housing;

a stopper member extending from said space to outside said movable housing;

means for elastically pressing said stopper member toward said engaging portion, whereby engagement of said engaging portion with said stopper member prevents rotation of said movable housing, said stopper member being automatically released from engagement with said engaging portion when said cable reel is installed on said rotating mechanism;



a conductor positioned on said fixed housing; and

a slip ring mounted on said movable housing such that said slip ring electrically contacts said conductor.

4,966,335

SPEED CHANGER FOR FISHING REELS

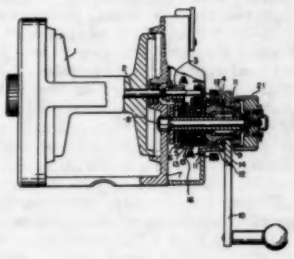
Kyoichi Kaneko, Tokyo, Japan, assignor to Daiwa Seiko Inc., Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 337,005

Claims priority, application Japan, May 13, 1988, 63-116654; Aug. 11, 1988, 63-200477; Aug. 26, 1988, 63-111700[U]

Int. Cl.[5] A01K *89/015*

U.S. Cl. 242—255 4 Claims



1. A speed changer for fishing reels comprising a driving gear-carrying driving shaft having a driving gear mounted thereon, a handle-carrying handle-turning tube mounted on an outer portion of said driving shaft via a one-way clutch so that said handle-turning tube can be turned unitarily with said driving shaft in a fishing line take-up direction, a pinion mounted on a spool-turning spool shaft, with which pinion said driving gear is meshed, planetary gears supported rotatably on shafts extending from an inner end portion of said handle-turning tube, an internal gear mounted on and rotatable with said driving shaft, with which internal gear outer portions of said planetary gears are meshed, a sun gear fitted rotatably around said driving shaft, with which sun gear inner portions of said planetary gears are meshed, a change-over member having locking teeth at its outer circumferential portion and formed unitarily with said sun gear, and a stopper pawl formed so that

said stopper pawl can be engaged with and disengaged from said locking teeth by an operating member.

4,966,336

FISHING REEL ASSEMBLY

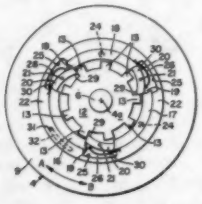
Raymond Humble; Main Hudson, and Charles Norris, all of Alnwick, Great Britain, assignors to House of Hardy Limited, Northhumberland, United Kingdom

Filed Apr. 13, 1989, Ser. No. 337,569

Claims priority, application United Kingdom, Mar. 2, 1989, 8904753

Int. Cl.[5] A01K *89/033*

U.S. Cl. 242—295 **15 Claims**



1. A fishing reel assembly comprising a line spool member mounted on a spool carrier for rotation about its axis relative to said spool carrier; drag means on the carrier, and coupling means for drivingly engaging or disengaging the drag means with the spool member whereby with the coupling means drivingly engaged, relative rotation between the spool member and the carrier is resisted by the drag means and with the coupling means disengaged the spool member can rotate relatively freely with respect to the carrier, and wherein means is provided for optionally adjusting said coupling means from a first condition to a second condition, in said first condition and during relative rotation between the spool member and carrier in one sense of direction the spool member rotates relatively freely with respect to the carrier and during said relative rotation in an opposite sense of direction the coupling means engages the spool member with the drag means for resistance to be imparted to the rotation of the spool member, and in said second condition and during relative rotation between the spool member and carrier in said one sense of direction the coupling means engages the spool member with the drag means for resistance to be imparted to the rotation of the spool member and during said relative rotation in said opposite sense of direction the spool member rotates relatively freely with respect to the carrier, said drag means having a rotor member which is rotatable, under resistance, with respect to the carrier and co-axially with respect to the spool member, and said coupling means comprising an adjustable component which is optionally adjustable from a first position corresponding to said first condition in which during relative rotation between the spool member and carrier in said one sense the spool member rotates relatively freely with respect to the rotor member and during said relative rotation in the opposite sense the spool member is drivingly engaged with the rotor member to impart resistance to said rotation of the spool member, to a second position corresponding to said second condition in which during relative rotation between the spool member and carrier in said one sense the spool member is drivingly engaged with the rotor member to impart resistance to said rotation of the spool member and during said relative rotation in the opposite sense the spool member rotates relatively freely with respect to the rotor member, said coupling means comprising a first catch rotatable with one of the spool and rotor members, a circumferential array of teeth rotatable co-axially with the other of said spool and rotor members and biasing means which biases the first catch in a sense to engage said teeth and wherein the adjustable component optionally adjusts the first catch, so that in the first position of the adjustable component during relative rotation between the spool member and carrier in said one sense the first catch is displaced by said teeth and against its biasing means out of engagement with the teeth for the spool member to rotate freely relative to the rotor member and during said relative rotation in the opposite sense the catch is displaced by its biasing means to engage said teeth for the spool member to drivingly engage the rotor member for resistance to be imparted to said rotation of the spool member, and in the second position of the adjustable component during said relative rotation in said one sense the first catch is displaced by its biasing means to engage said teeth for the spool member to drivingly engage the rotor member for resistance to be imparted to said rotation of the spool member and during said relative rotation in said opposite sense the first catch is displaced by said teeth and against its biasing means out of engagement with the teeth for the spool member to rotate freely relative to the rotor member, and a second catch circumferentially spaced from said first catch concentrically with respect to said circular array of teeth, each such catch having associated therewith biasing means which biases it into engagement with said teeth and wherein the adjustable component is common to said catches and comprises means for simultaneously effecting their respective adjustment to said first or second position.

4,966,337

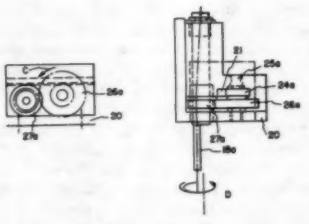
MULTI-SPINDLE MACHINE FOR WINDING WIRE ON BOBBINS

Rudolf Fahrbach, Branchville, N.J., assignor to Universal manufacturing, N.J.

Filed May 17, 1989, Ser. No. 352,867

Int. Cl.[5] H01F *41/06*

U.S. Cl. 242—7.09 **6 Claims**



1. A winding machine to simultaneously wind wire on a plurality of extending terminals, the machine winding wire about said terminals, the machine including:

a frame, spindle means mounted on said frame and including a plurality of rotatable spindles, each spindle having means to receive and rotate a bobbin; a plurality of bobbins each having a plurality of bobbin terminals thereon and each removably mounted on one of said spindles;

rotating means to rotate the spindles to wind wire on the bobbins;

wire nozzle plate means slidable on the frame in a first direction and in a second direction perpendicular to the first direction;

a plurality of hollow wire feed nozzles mounted on the plate means with a nozzle being associated with each spindle, each nozzle feeding wire to a bobbin mounted on said associated spindle; a plurality of parking pins connected to the frame,

wire supply means to feed wire to each wire feed nozzle; and

plate control means to automatically move the plate means in the first and second directions to position the wire feed nozzles relative to the bobbin terminals to be wound;

characterized in that the winding machine further includes:

a gear rack having an imaginary axis which is movable along

said gear rack axis in a first direction and in a second direction opposite to said first direction;

motor means to move said gear rack back and forth along said gear rack axis;

gear system means including a plurality of gear trains with each gear train bei. ɜ in mesh with said gear rack and rotating in response ₀o movement of said gear rack; and

eccentric means to eccentrically mount each of said nozzles on one of said gear trains to rotate the nozzle about a nozzle imaginary axis in response to movement of the gear rack;

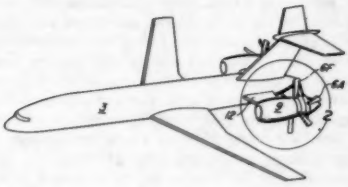
wherein said motor means moves said gear rack along said gear rack axis in the first direction to wind wire about a bobbin terminal and in the second direction to wind wire about a parking pin.

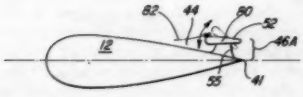
4,966,338

AIRCRAFT PYLON

Bruce J. Gordon, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Aug. 5, 1987, Ser. No. 81,772
Int. Cl.[5] B64C *23/00*; B64D *27/00*
U.S. Cl. 244—54 **10 Claims**





1. In an aircraft propulsion system which includes (A) an engine which drives a pusher propeller, (B) a support which extends between the engine and the aircraft and which supports the weight of the engine, and (C) a pylon located forward of the propeller for reducing drag of the support, the improvement comprising:

(a) a movable vane, which does not control yaw, pitch, roll, or lift of the aircraft, effective for reducing wakes produced by the pylon.

4,966,339

KNIFE STAND

Keh J. Lu, No. 16, Ching Mei Road, Taiping Hsiang, Taichung, Taiwan

Continuation of Ser. No. 142,646, Jan. 11, 1988. This application Oct. 20, 1989, Ser. No. 424,391
The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.
Int. Cl.[5] A47F *1/00*
U.S. Cl. 248—37.3 **7 Claims**

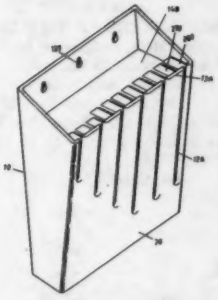
1. A stand adapted to receive and secure several knives in desired position, each knife having a blade portion and a handle portion, said stand comprising:

a support body having a front piece and an upper rearward extending support piece for said handle portion, said front piece presenting an upper edge spaced above said upper piece,

said front piece having a plurality of spaced apart longitudinal slits extending downward from the upper edge towards a bottom edge of said front piece to permit passage of only a knife blade portion into a slit in a manner that said upper piece serves as a support for a handle portion of a knife,

at least a portion of said slits continuing into adjacent portions of said upper piece,

said upper piece is formed with an upper surface for supporting said handle portions in which said upper surface takes



the form of a substantially continuous flat surface common to each said handle portions when supported by said upper surface, and

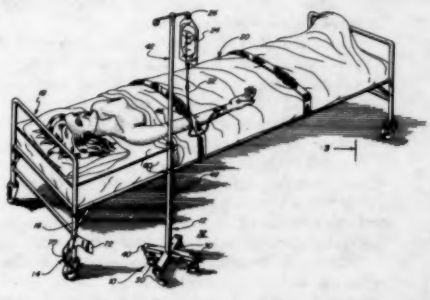
positioning members comprising rectangular blocks arranged parallel to each other projecting from said upper surface of said upper piece in the direction of the upper edge and adjacent said slits to form in cooperation with said front piece and said upper piece receiving pockets for a handle portion of a knife.

4,966,340

WHEELED STAND APPARATUS FOR HANGING CONTAINERS OF MEDICAL FLUIDS

Rebecca L. Hunter, 157 Avenida Veracruz, Anaheim Hills, Calif. 92808

Filed Apr. 24, 1989, Ser. No. 342,733
Int. Cl.[5] F16M *1/04*
U.S. Cl. 248—125 **9 Claims**



1. A stand apparatus for carrying medical fluids, such as blood plasma and saline solutions, in a manner enabling the fluids to be gravity flowed into a patient, said stand apparatus comprising:

a. a base;

b. a plurality of wheels mounted to said base to enable the rolling thereof along a floor or the like;

c. an elongate, slender support member having means at an upper end region to enable the hanging of fluid dispensing containers therefrom;

d. hinge means for connecting the lower end of the support

member to the base in a manner enabling the support member to be pivoted between a first, upright position in which the support member is perpendicular to the base, and a second, folded position in which the support member is parallel to the base; and,

e. bracket means adapted for being attached to a leg of a gurney, hospital bed, and the like and for receiving said base when the base is in a substantially vertical condition.

4,966,341

MODULAR MULTILEVEL ARTICLE OF FURNITURE

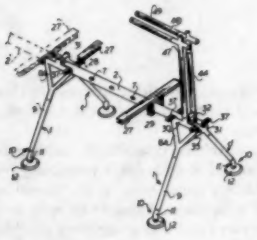
Paolo Borsani, Milan, Italy, assignor to Tecno S.p.A. Mobili e Forniture per Arredamento, Milan, Italy

Division of Ser. No. 390,433, Aug. 3, 1989, abandoned, which is a continuation of Ser. No. 97,484, Sep. 15, 1987, abandoned. This application Apr. 4, 1990, Ser. No. 506,544

Claims priority, application Italy, Sep. 15, 1986, 23020/86[U]; Sep. 15, 1986, 23022/86[U]

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—165 **5 Claims**



1. An article of furniture comprising:

a modular support including:

an elongated horizontal cylindrical one-piece tubular element extending longitudinally and formed at longitudinally spaced locations with pairs of diametrically and horizontally oppositely open lateral threaded connectors having horizontal axes,

at least one surface-carrying member provided with at least one pair of connecting formations straddling the cylindrical element in alignment with a corresponding pair of the threaded connectors,

two longitudinally spaced pairs of legs connected to the cylindrical element at the ends thereof with the legs of each pair lying in a common generally vertical plane, each pair of legs being provided with a respective connecting formation upwardly straddling the cylindrical element and aligned with a respective pair of the threaded connectors,

respective horizontal ties interconnecting the legs of each pair below the cylindrical element,

screws traversing the formations along the horizontal axes and threaded into the threaded connectors aligned therewith for securing the surface-carrying member and the legs to the cylindrical element,

respective pairs of upright connection stubs projecting upwardly from the connecting formations of the legs to each side of the cylindrical element;

means forming a lower working plane for the article of furniture mounted on the surface-carrying member;

respective uprights fixed to and projecting upward from the connection stubs past the lower working plane;

respective horizontal elements connected between the uprights above the lower working plane; and

means forming an upper working plane for the article of furniture mounted on the horizontal elements above the lower working plane.

4,966,342

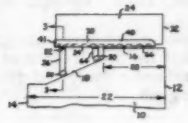
VIDEO CASSETTE RECORDER SUPPORT MECHANISM

Norian Noguera, 5120 Santa Monica Blvd., Los Angeles, Calif. 90029

Filed Aug. 21, 1989, Ser. No. 396,338

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—172 **2 Claims**



1. A mechanism for supporting a rectangular video cassette recorder on the upper sloped surface of a television receiver cabinet; said support mechanism comprising a rectangular platform (34) having a front-to-rear central axis (46), and two vertical posts (36) extending downwardly from said platform;

said rectangular platform comprising two horizontal plates (37) adapted to underlie rear corner sections and side sections of a cassette recorder; each horizontal plate having a rear edge adapted to parallel a rear face of recorder, an upstanding rear flange (41) extending upwardly from the plate rear edge, whereby a cassette recorder is prevented from movement off of the platform;

said platform further comprising a connector plate (38) spanning the platform front-to-rear axis (46), with sections thereof overlying portions of said horizontal plates (37); said connector plate having a horizontal slot means (45) extending normal to the platform front-to-rear axis; and threaded retainer means (47) extending through said slot means (45) into each horizontal plate whereby said horizontal plates (37) are retained in selected positions of lateral adjustment; said connector plate having an upstanding flange (43) extending upwardly therefrom in facial contact with said upstanding rear flanges (41) on said horizontal plates, whereby the rear edges of the horizontal plates maintain a parallel relation with the rear face of the recorder;

each horizontal plate having a side edge and a slot (55) extending in a front-to-rear direction parallel to the plate side edge; each said vertical post (36) comprising a vertical bar having a horizontal flange (52) at its upper end, a threaded clamp element (54) extendable downwardly through one of said slots into said horizontal flange (52) for holding said post in selected positions of adjustment measured in the direction of the slot, a foot structure (50) at the lower end of said bar, and a pivotal connection (60) between said foot structure and said bar, whereby the lower surface of the foot structure is adapted to seat flatwise on a downwardly sloped surface of a television receiver cabinet.

4,966,343

AESTHETIC SHELVING SYSTEM

Walter L. Bessinger, Grand Haven, Mich.; William E. Stumpf, Minneapolis, and Casey L. Carlson, Edina, both of Minn., assignors to Knape & Vogt Manufacturing Company, Grand Rapids, Mich.

Filed Jul. 14, 1989, Ser. No. 381,149

Int. Cl.[5] A47G *29/02*

U.S. Cl. 248—243 **28 Claims**

1. A shelving standard and bracket assembly comprising:

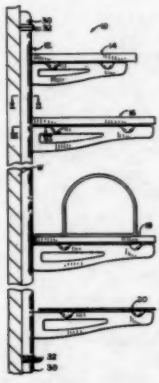
vertical standards to be mounted to a wall in spaced parallel relationship to each other;

said standards each having a front face and a pair of spaced side faces;

said front face having a plurality of vertically spaced slots and intermediate webs for attachment of cantilever brackets thereto;

an elongated cover on each of said standards;

said cover having a generally U-shaped cross sectional configuration with a pair of legs, said legs being resiliently biased toward each other to a freestanding spacing smaller than the spacing of said standard side faces, and shiftable against the bias to a spacing substantially equal to that of said standard side faces, to grip said standard;



said cover having a plurality of vertically spaced slots to generally align with said standard slots;

cantilever brackets having side walls and having rear lugs inserted through said cover slots and through said standard slots to anchor on said webs;

said cover extending forwardly of said standard front face and including means abutting said bracket side walls for stabilizing said brackets, whereby said brackets vertically anchor said cover relative to said standard and said cover laterally stabilizes said brackets.

4,966,344

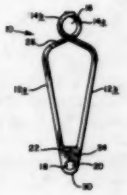
PLASTIC ORNAMENT HANGER

Lonnie F. Gary, Lubbock, Tex., assignor to Gary Products Group, Inc., Lubbock, Tex.

Filed Aug. 21, 1989, Ser. No. 396,518

Int. Cl.[5] A47H 1/10

U.S. Cl. 248—317 **4 Claims**



1. A molded polymeric hanger adapted to hang a decorative ornament provided with a suspension loop from a support member, the hanger comprising:

first and second support arms;

a hinge joining the support arms at one end thereof;

first and second recurved end portions connected to the support arms opposite the hinged end;

the first and second support arms respectively comprising first and second fastening means proximal to the hinge, said first and second fastening means being adapted to releasably engage each other whenever the first and second support arms are folded around the hinge;

said first and second fastening means and said hinge cooperating to define a closed loop at the hinge end of said support arms whenever the support arms are folded around the hinge and the first and second fastening means are releasably engaged;

said closed loop being sufficiently large to surround the support loop of the decorative ornament and being adapted to confine the support loop at the hinge end of the support arms;

said recurved end portions being adapted to separate sufficiently to admit the support member therebetween whenever a compressive force is applied to the support arms between the fastening means and the recurved end portions, and to surround the support member following release of the compressive force.

4,966,345

PROP

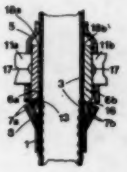
Nicolas Bersier, Bulle, Switzerland, assignor to Etablissement Nanicoba, Vaduz, Liechtenstein

Filed Jun. 16, 1989, Ser. No. 366,980

Claims priority, application Switzerland, Jun. 28, 1988, 02446/88

Int. Cl.[5] F16M 13/00

U.S. Cl. 248—354.3 **6 Claims**



1. A prop comprising a central screw movable axially in an outer tube forming a support, a head mounted to turn on one end of said tube, and a threaded nut composed of two angular nut parts mounted in the head for radial displacement, relative to the screw, between a position in which said nut parts cooperate with the thread of the screw and a position in which said nut parts are released from said thread of the screw, the threads on said nut parts being symmetrical in configuration, the threads on said screw, viewed in axial section and with the prop standing vertically and with said head at the top end of the tube, having a top flank whose shape matches that of the symmetrical thread of each said nut part and a bottom flank which is asymmetrical and extends over a greater axial length

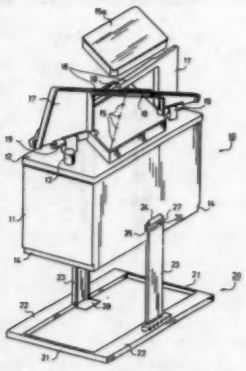
than the top flank and has a mean shape less than the top flank so that, when a load acts on the prop, the screw is retained axially in position by engagement of said top flank of the threads of said screw with the threads of said nut parts and said screw can be raised when the head is turned to turn the nut parts in the direction corresponding to said raising, while, when the prop is relieved of load and a sufficient upward pull is applied manually to the screw, the resultant force on the threads of the screw causes the nut parts to move away from and disengage from the central screw to enable the screw to be displaced axially in the nut parts without said nut parts being turned, means being provided to bring said nut parts into the position of disengagement from the screw in order to allow the screw to return to its bottom position through the action of gravity.

4,966,346

MOUNTING FIXTURE FOR STORAGE BATTERY

Toivo Kärnä; Jukka-Pekka Nieminen; Asko Miisti, all of Porvoo, and Hannu Kähönen, Helsinki, all of Finland, assignors to Neste OY, Finland

Filed Oct. 13, 1989, Ser. No. 421,282
Int. Cl.[5] H01M *2/10*
U.S. Cl. 248—503 **4 Claims**



1. A mounting device in combination with a storage battery for securement to a base, the device comprising:

a footing adapted to be rigidly fastened to the base, the footing being separate from the storage battery to permit engagement and disengagement of the footing from the storage battery; and

a set of locking elements pivotally attached to the storage battery and configured for engagement detachably with said footing to accomplish a rapid locking of the storage battery to the footing wherein

said footing comprises a base portion and elongated yokes upstanding from the base portion, the yokes being spaced apart for receiving the storage battery therebetween upon the mounting of the battery on the footing;

said locking elements are engagable with said yokes for locking the battery to the footing; and

further comprising a cover for said battery, and wherein said yokes comprise fastening lugs located on the yokes in registration with said cover of said battery upon a mounting of a battery in the footing; and

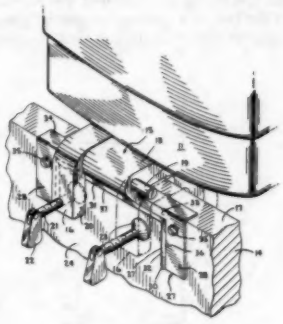
locking grooves are provided in said yokes for receiving locking elements of said set of locking elements.

4,966,347

OUTBOARD MOTOR RETAINER

Charles W. Mapes, and Richard H. Snyder, both of Oshkosh, Wis., assignors to Brunswick Corporation, Skokie, Ill.

Continuation of Ser. No. 241,629, Sep. 8, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,664
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—643 **7 Claims**



1. A retainer assembly for a transom-mounted outboard boat motor comprising, in combination:

a boat transom;

a motor transom bracket having transom-engaging clamping members including a pair of thumb screws threadably attached to the transom bracket, each screw having a clamping pad on one end including a clamping face adapted to engage the transom, said clamping pads being adjustable between a normally clamped position in engagement with the transom and an unclamped position disengaged from the transom;

a retaining lip attached to the transom and substantially completely surrounding the upper and lateral regions of engagement between the clamping pads and the transom;

said retaining lip having a generally horizontal upper portion and lateral portions extending downwardly from each end of said upper portion, said lateral portions spaced apart a distance greater than the maximum distance between said clamping pads, whereby the clamping pads are adjustable between said clamped and unclamped postions without engaging said lip; and,

said retaining lip diverging along substantially the full length thereof from the transom toward the clamping pads, said lip and the adjacent face of the transom defining a groove large enough to receive and engage the edge of a clamping pad displaced from said normally clamped position and to prevent further displacement thereof in the lateral and upward directions.

4,966,348

METHOD AND APPARATUS FOR MONITORING ATMOSPHERE IN FURNACES

Harry E. Schneider, Elmwood Park, Ill., assignor to Lindberg Corp., Chicago, Ill.

Filed Jun. 30, 1989, Ser. No. 374,441
Int. Cl.[5] C21D *11/00*
U.S. Cl. 266—79 **26 Claims**

1. A heat treating retort comprising

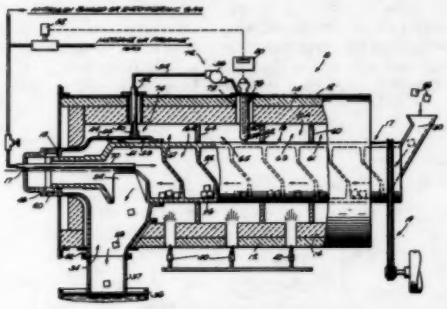
a furnace housing having an interior area,

a retort supported for rotation within the interior area of the furnace housing, the retort including an interior chamber having an inlet region for receiving the material to be heat treated, an outlet region for discharging the material after heat treatment, and means for advancing the material from

the inlet region to the outlet region during rotation of the retort,

means for introducing a treatment atmosphere into the retort chamber,

means for directly heating the interior area of the furnace to indirectly heat the retort chamber and establish an operative temperature region between the inlet and outlet regions of the retort chamber where predetermined temperature conditions exists to cause the desired reaction between the material and the treatment atmosphere to occur within the retort chamber, and



means for analyzing the treatment atmosphere present within the retort chamber including sampling means communicating with the retort chamber for withdrawing samples of the treatment atmosphere, probe means communicating with the sampling means for analyzing the sampled atmosphere, and vessel means projecting into the interior furnace area in the operating temperature region and supporting the probe means outside the retort chamber for indirect heating at the predetermined temperature conditions so that the atmosphere sampled within the retort chamber is analyzed outside the retort chamber at the predetermined temperature conditions.

4,966,349

SUPPORTING ARRANGEMENT FOR CASTING LADLES PROVIDED IN A CONTINUOUS CASTING PLANT

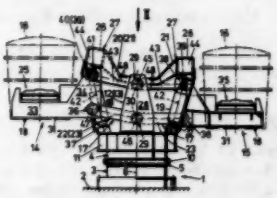
Werner Scheurecker; Ronald Spannlang, both of Linz; Istvan Kalmar, Vienna; Manfred Leutgöb, Ennsdoft, and Armin Schertler, Vienna, all of Austria, assignors to Voest-Alpine Industrienlagenbau, Linz, Austria

Filed Feb. 14, 1990, Ser. No. 479,965

Claims priority, application Austria, Feb. 15, 1989, A335/89

Int. Cl.[5] B22D *41/00*

U.S. Cl. 266—276 **5 Claims**



1. In a supporting arrangement for casting ladles provided in a continuous casting plant and including a stationarily mounted permanent base, a rotary base, a rotation drive adapted to rotate said rotary base relative to said permanent base, at least one supporting bracket system adapted to retain a casting ladle, a linkage parallelogram system composed of a plurality of superimposed guiding rod means and adapted to hinge said at least one supporting bracket system to said rotary base, said guiding rod means including upper guiding rods and lower guiding rods and being pivotable about horizontal axes, and at least one pressure medium cylinder for lifting and lowering said supporting bracket system relative to said rotary base, the improvement comprising

two independent supporting brackets forming said supporting bracket system, each of said supporting brackets being separately hinged to one of said lower and one of said upper guiding rods of said linkage parallelogram system.

a cross beam for uniting said upper guiding rods of said linkage parallelogram system on their ends facing away from said rotary base so as to form a unit, said unit being U-shaped in ground plan,

a swivel adapted to support said cross beam on said at least one pressure medium cylinder and first hinge means arranged on said upper guiding rods on their ends facing away from said rotary drive so as to be in alignment with said swivel.

4,966,350

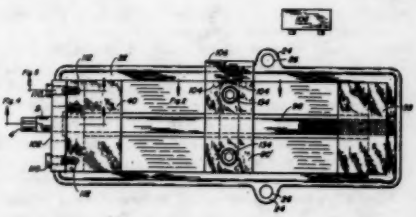
WIDE-OPENING VISE

James P. Chick, Jefferson Township, Butler County, Pa., assignor to James P. Chick, Butler, Pa.

Filed Dec. 5, 1988, Ser. No. 279,853

Int. Cl.[5] B25B *1/10*

U.S. Cl. 269—43 **4 Claims**



1. A precision machine vise which is convertible between:

a first function of operating as a two-place precision vise which is capable of grasping first and second workpieces against a central jaw member which has opposing planar faces adapted to serve as datum planes for the holding of the two workpieces, with grasping pressure being put onto each of said first and second workpieces by means of a screwshaft which is threadedly engaged with a first movable jaw and is mounted for free axial translational movement and comprises means for exerting pressure against a second movable jaw and

a second function of operating as a one-place and wider-opening precision vise,

said vise comprising a removable central fixed jaw member snugly keyed into the base of the vise and bolted thereto from the top,

a portion of the base of said vise which is proximal to the operating handle of said vise, said portion having a smooth ground and polished substantially planar surface extending in a vertical direction,

a horseshoe-shaped member adapted to be brought into contact with said surface extending in a vertical direction and into contact with a vertically extending smooth planar surface of said second movable jaw,

said horseshoe-shaped member having bores therein which register with threaded openings in said vertically extending surface portion of said base and in said second jaw member,

and bolt means for securing said second jaw member and said portion to said horseshoe-shaped member, whereby said second jaw member is held in a fixed position when said vise is operated in the mode of said second function.

4,966,351

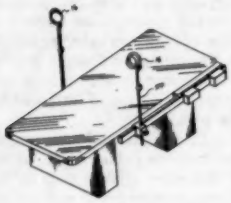
STIRRUP ADAPTER ASSEMBLY

Brian J. Klepacki, 6470 W. 74th Ave., Arvada, Colo. 80003

Filed Nov. 21, 1989, Ser. No. 439,342

Int. Cl.[5] A61G *13/00*

U.S. Cl. 269—328 1 Claim



1. A new and improved stirrup adapter assembly for use with a medical examination table, said assembly comprising,

adapter block means operably attachable to an existing side rail of said medical examination table,

extension bar means operably attachable to said adapter block means; and

stirrup holding block means adjustably attached to said extension bar means spaced from the adapter block means, and

wherein said medical examination table is an angiographic medical examination table, and

wherein said adapter block means includes at least one adapter block, the adapter block including a top surface and a bottom surface, the bottom surface including a extensive "T" shaped groove to receive said existing side rails, thereby to fixedly secure said adapter block to said medical examination table, and the top surface including a coextensive groove, the recessed groove including a plurality of threaded bores directed into the adapter block from the groove wherein the threaded bores extend forward the "T" shaped groove but terminate within the block, and a fastening member receivable within each threaded bore and directed through the extension bar means to secure the extension bar means within the groove, and

wherein said stirrup holding block means includes a stirrup holding block having a "T" shaped groove slidably positionable over said extension bar means, and

wherein said stirrup holding block further includes a first through-extending aperture for receiving a support bar associated with a stirrup, and

wherein said stirrup holding block includes a second aperture for receiving a threaded fastener, said second aperture intersecting the first aperture, said threaded fastener serving to fixedly secure said stirrup within said first through extending apertures.

4,966,352

SYSTEM FOR PROCESSING A WEB

Pierre Nattin, Massagno, Switzerland, assignor to Fobelmac Consulting AG, Zug, Switzerland

Division of Ser. No. 17,208, Feb. 20, 1987, Pat. No. 4,805,501.

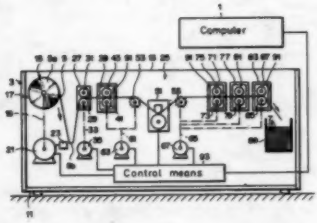
This application Nov. 28, 1988, Ser. No. 276,573

Claims priority, application Switzerland, Oct. 15, 1986, 04128/86

Int. Cl.[5] B41F *13/54*

U.S. Cl. 270—1.1 40 Claims

1. System for processing at least one flexible web, the web preferably consisting at least in part of paper, for producing documents therefrom, the system comprising a frame, a first processing device supported on the frame, a printing device supported on the frame and adapted to receive electrical data in digital form and to print variable information and/or data onto the web in response to said electrical data, at least one further processing device supported on the frame, transporting means for conveying the web from said first processing device to and past the printing device and from said printing device to said at least one further processing device, wherein said first processing device includes two rotatable processing members adapted to provide the web at each of its two longitudinal margins with a row of holes running in the longitudinal direction of the web, wherein said at least one further processing device comprises at least one further rotatable processing member adapted to process the web conveyed past said at least one further processing member, said transporting means being arranged to comprise transporting members movably supported on the frame and adapted to engage and convey the web, electrical drive means for driving said transporting members and said processing members, electrical control means connected electrically with said drive means and adapted to



control said drive means in such a way, that the rotatable processing members adapted to be driven by said drive means are set in motion or are brought to rest substantially simultaneously with said movable transporting members which engage the web, said processing members, when in rotation, being rotated with angular velocities substantially proportional to the velocities of said transporting members, to have it printed on by said printing device and processed by said processing devices with synchronous timing, wherein shelves and guiding means associated with said shelves supported on the frame are provided, wherein said processing devices are arranged to comprise a support adapted to support the or each processing member and to be slid along the guiding means into and out of the corresponding shelf, and wherein loosenable securing means are provided, for securing said support in a working position predetermined for the operation.

4,966,353

CHIEF FOLDING MACHINE WITH EYE ADHESIVE MOISTENER

Werner Leimann, Gutach; Manfred Fuss, St. Georgen, and Joachim Kurtz, Monchweiler, all of Fed. Rep. of Germany, assignors to Mathias Bäuerle GmbH, St. Georgen, Fed. Rep. of Germany

Filed Sep. 6, 1988, Ser. No. 241,082

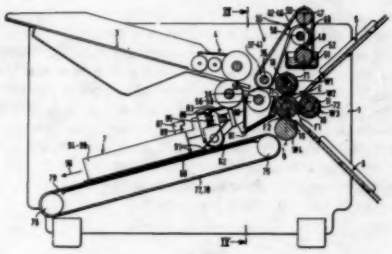
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729658

Int. Cl.[5] B42C *1/00*

U.S. Cl. 270—45 10 Claims

1. In a device for feeding successive sheets which have a plurality of transversely spaced dry adhesive areas thereon which device includes a plurality of folding rolls arranged along a sheet feed path and between which the sheets are fed and which includes at least one pocket to which the sheets are fed after they have been folded at least once by the folding rolls, the improvement comprising; a sheet wetting means comprising a plurality of moveable belts arranged over said sheets, guide means for guiding said belts so they move through a path overlying said sheets, drive means for driving said belts, compressor support means arranged on the side of said sheet opposite the said belts and urging at least one of said

belts into contact with the sheet as it is fed between said compressor means and said belt, and wetting means positioned to wet said belts as they are moved so that the wet belts moisten those dry adhesive areas of said sheets with which they are pressed into contact by said compressor support means said compressor support means including a means for shifting at least one of said belts into contact with said sheet to cover a dry adhesive spot area and a compressive disk for maintaining



at least one of other of said belts into substantially continuous contact with at least one other of said dry adhesive areas of said sheet, said means for shifting at least one of said belts into contact with said sheet comprising an electromagnetic intermittently actuable member connected to said compressor support means and carrying at least one compressor element which is moveable thereby into association with said sheet to urge it into contact with said belt.

4,966,354

METHOD OF AND MACHINE FOR GATHERING PAPER SHEETS AND THE LIKE

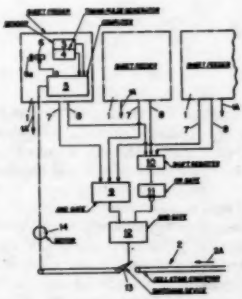
Roland Grunder, Vordemwald, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

Continuation of Ser. No. 134,000, Dec. 17, 1987, abandoned. This application May 22, 1989, Ser. No. 356,584

Claims priority, application Switzerland, Dec. 18, 1986, 5049/86-3

Int. Cl.[5] B65H *43/02*

U.S. Cl. 270—56 **20 Claims**



1. A method of manipulating sheets in a gathering machine wherein at least one feeder supplies successive sheets at predetermined intervals into a predetermined path along which the sheets are transported and wherein the sheets are accumulated into stacks or analogous formations, comprising the steps of monitoring the thickness of successive first sheets on their way toward said path; counting the number of successive monitoring steps; calculating a range of acceptable thicknesses based on the last one of a preselected number of successive at least approximately identical first sheet thicknesses, said calculating step being performed in such a manner that the middle of said range is a function of said last monitored first sheet thickness; monitoring the thicknesses of successive second sheets on their way toward said path; comparing the monitored second sheet thicknesses with said range and generating signals denoting the relationship of each monitored second sheet thickness to said range; and expelling said second sheets from said path in response to said signals when monitored second sheet thickness is outside of said range.

4,966,355

COPYING PAPER FEEDING DEVICE FOR AN ALIGNMENT TRAY OF A COPY MACHINE

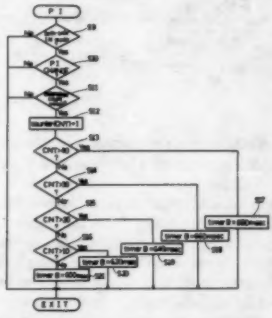
Toshinobu Katafuchi, Hyogo, and Hiroyuki Hamakawa, Nara, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jul. 27, 1988, Ser. No. 225,007

Claims priority, application Japan, Jul. 31, 1987, 62-193117; Aug. 31, 1987, 62-218295

Int. Cl.[5] B65H *5/22*

U.S. Cl. 271—3.1 **3 Claims**



1. A copying paper feeding device for an intermediate tray of a copying machine, wherein pressed by a push-out roller, copying papers having one side formed with a toner image and stored temporarily within the intermediate tray are fed by the rotation of the push-out roller in the direction of a copying paper alignment means located downstream, charscterized in that a means is provided for counting a number of copying papers fed into said intermediate tray and a means is provided for increasing a time of rotation of the push-out roller of the copying papers in response to the count of the number of copying papers fed into said intermediate tray, whereby upper positioned copying papers are pushed forward a little further than lower-positioned copying papers until the upper-positioned copy papers collide with said copy paper alignment means.

4,966,356

APPARATUS FOR SELECTIVELY FEEDING CUT SHEETS IN A RECORDING MACHINE

Keiji Ohyabu, Tokyo; Shinichi Watarai, and Hideaki Sano, both of Yokohama, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Sep. 27, 1988, Ser. No. 249,655

Claims priority, application Japan, Sep. 30, 1987, 62-243621; Oct. 8, 1987, 62-252524; Mar. 11, 1988, 63-57545

Int. Cl.[5] B65H *3/44*

U.S. Cl. 271—9 **22 Claims**

1. A sheet feed apparatus for a recording machine which records an image on a sheet, comprising:

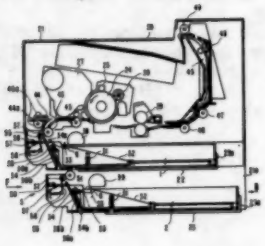
a plurality of sheet holding means, stackable one above the

other, each having a top and bottom and holding a plurality of sheets stacked in a pile therein;

support means for supporting said plurality of sheet holding means alternatively at a predetermined normal position and in a forwardly drawing position; and

each of said holding means include a sheet feed passage within each sheet holding means for passing sheets fed from said pile of said sheets, and converging with a sheet feed sub-passage provided at a forward end of said sheet holding means and passing from the bottom to the top of said sheet holding means,

all of said feed sub-passages being aligned to form a substantially linear common sheet feed passage when all of said plurality of sheet holding means are set at said normal



position in said supporting means, said common sheet feed passage passing said sheets fed from any of said sheet feed sub-passages, and

wherein each of said sheet holding means includes a first passage side wall extending from the bottom to the top of said sheet holding means, a second passage side wall having a shorter length than that of said first passage side wall in an advancing direction of said sheet and being substantially parallel to and facing a lower portion of said first passage side wall, said first passage side wall and said second passage side wall forming said sheet feed sub-passage having an inlet at the bottom, an opened side portion in an upper portion thereof, and an outlet at a top portion of said first passage side wall.

4,966,357

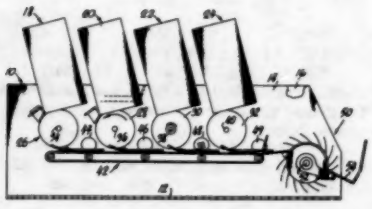
APPARATUS FOR DISPENSING A PRESELECTED MIX OF PAPER CURRENCY OR THE LIKE

Fredric W. Burger, Cherry Hill, N.J., assignor to Brandt, Inc., Bensalem, Pa.

Division of Ser. No. 238,032, Aug. 29, 1988. This application Jan. 16, 1990, Ser. No. 465,361

Int. Cl.[5] B65H *3/44*

U.S. Cl. 271—9 **10 Claims**



1. Apparatus for feeding sheets from a plurality of supplies along a predetermined path including in combination,

an elongated assembly in said housing for feeding sheets along said path in the direction of the length of said assembly from one end to the other end thereof,

a plurality of supplies of sheets spaced along the length of said assembly,

respective means for delivering sheets from said supplies to said feeding assembly,

an opening in a side of said housing adjacent to one of the longitudinal edges of said assembly,

said assembly comprising upper idler means,

means mounting said upper idler means in a fixed position in said housing,

lower conveyor means,

means for driving said lower conveyor means,

means mounting said lower conveyor means for pivotal movement around an axis extending in the direction of the length of said assembly between an operative position at which it cooperates with said idler means to feed documents along said path and an inoperative position remote from said idler means at which said path is accessible through said housing side opening and

releasable means for normally retaining said lower conveyor means in said operative position.

4,966,358

APPARATUS FOR FEEDING RECORDING MEDIUM, HAVING MEANS FOR EASY HANDLING OF JAMMING TROUBLE

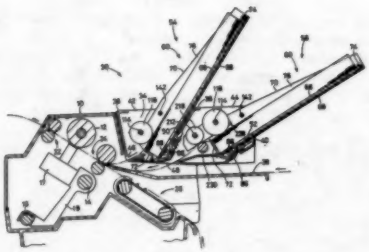
Takeshi Yokoi, Kakamigahara; Hiroyasu Kuragairi, Chita; Shigeo Nakamura; Tamotu Kato, both of Nagoya; Kazuo Umemura, and Hiroshi Yamanaka, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Jul. 20, 1988, Ser. No. 222,043

Claims priority, application Japan, Jul. 24, 1987, 62-185963; Nov. 20, 1987, 62-178218[U]

Int. Cl.[5] B65H *3/30*

U.S. Cl. 271—10 **24 Claims**



1. A feeding apparatus for feeding cut sheets one after another to a printer in a feeding direction, comprising:

a presser member engageable with an upper surface of an uppermost sheet of a stack of said cut sheets placed on a sheet support member, to thereby press said uppermost sheet toward said support member;

an elastic member disposed adjacent to said presser member and engageable with leading edges of said cut sheets, said elastic member being elastically deformed in said feeding direction according to a force of contact between said elastic member and said leading edges;

a feed roll engageable with said upper surface of said uppermost sheet, at a position rearwardly of said presser member, for exerting an advancing force on said uppermost sheet and thereby delivering said uppermost sheet toward said printer, through a clearance formed between said elastic member and said presser member due to elastic deformation of said elastic member; and

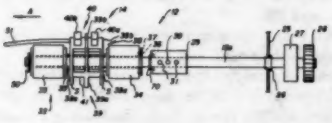
a clearance enlarging mechanism for enlarging said clearance by moving said presser and elastic members away from each other.

4,966,359

PAPER FEED UNIT FOR IMAGE FORMING APPARATUSES

Kiyotaka Arai, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Aug. 30, 1989, Ser. No. 400,438
Claims priority, application Japan, Aug. 31, 1988, 63-217706
Int. Cl.[5] B65H 7/02
U.S. Cl. 271—110 8 Claims



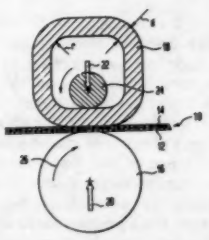
1. A paper feed unit for image forming apparatuses comprising a paper feed roller assembly having a paper feed shaft rotatably supported in the body of the image forming apparatus and a paper feed section slidably mounted on the paper feed shaft for removal therefrom and fixed to the paper feed shaft for integral rotation therewith, the rotation of said paper feed section causing a roller of said paper feed roller assembly to rotationally contact paper, thereby feeding the paper; and a paper detection switch so fixed to a given mounting portion adjacent to the paper feed section as to detect the presence of the paper to be fed by the paper feed roller assembly and mounted in such a way as to slide following a slide in the paper feed section when unfixed from the mounting portion.

4,966,360

TRANSPORT DEVICE FOR A MULTIPLE LAYERED WEB MATERIAL

Adam Pawlowski, Berlin, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Sep. 6, 1989, Ser. No. 403,337
Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 8811453[U]
Int. Cl.[5] B65H 5/06
U.S. Cl. 271—272 9 Claims



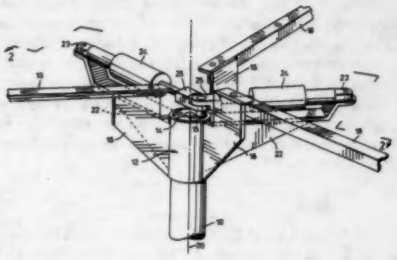
1. A transport device for multiple layered web materials (10), especially multiple layered graphic carriers for a printing device, with at least one transport roll (16) and at least one associated pressure roll (18) with an axis parallel to the axis of the transport roll, with the transport roll (16) and the pressure roll (18) being biased toward one another in a radial direction, characterized in that the pressure roll (18) has the shape of a straight hollow prism open at both ends with a wall thickness uniform over its entire circumference, and that the pressure roll (18) is supported on a shaft (24) passing through the hollow space of the prism with play.

4,966,361

DAMPED ROTATING PLATFORM FOR PARKS

Gary G. Knill, Princeton, Canada, assignor to Paris Playground Equipment Inc., Paris, Canada

Filed Aug. 14, 1989, Ser. No. 392,882
Int. Cl.[5] A63G 1/12
U.S. Cl. 272—33 R 4 Claims



1. A child's play structure comprising:

a central, non-rotating support means, a platform large enough to support at least one child,

mounting means pivotally mounting the platform to the support means in such a way that the platform can rotate about a substantially vertical axis, and

movement resisting means including at least one hydraulic cylinder shock absorber mounted between a first location on the platform and a second location on the support means which is eccentric with respect to said vertical axis, such that, as the platform rotates, the distance between said first and second locations varies, whereby said at least one shock absorber is forced to change its length, thus causing the platform rotation to be resisted.

4,966,362

WHEELCHAIR EXERCISER ADAPTER

Donald B. Ramaekers, 9655 SW. Murdock St., Tigard, Oreg. 97224

Filed Apr. 11, 1988, Ser. No. 179,749
Int. Cl.[5] A63B 22/02
U.S. Cl. 272—93 19 Claims

1. A wheelchair exerciser adapter for use with a wheelchair, the wheelchair having a pair of rear drive wheels, coaxial and spaced apart, and drivable by effort of a wheelchair occupant for propelling the wheelchair, and at least one forward stabilizing wheel, said wheel being significantly smaller than the drive wheels, comprising:

a generally flat frame having a bottom side for supporting the frame above a floor;

first and second elongated rollers rotatably supported athwart the frame, lying parallel to each other and spaced apart so as to define a cradle for receiving the drive wheels of the wheelchair; and

a ramp carried by the frame outside the cradle and having a gently sloping upper surface extending from a lower end disposed in a plane adjacent the plane of the bottom side of the frame to an upper end disposed adjacent the first roller, whereby the wheelchair drive wheels may roll directly from the upper end of the ramp onto the first roller, the rollers and ramp being disposed so that, when the drive wheels of a wheelchair are cradled by the rollers and the front of the wheelchair is towards the ramp, the at least one forward wheel of the wheelchair is supported by the ramp and wherein the overall length of the exerciser adapter is approximately equal to the overall length of a wheelchair.

4,966,363

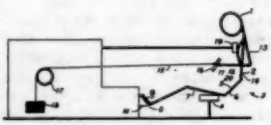
MUSCULAR DEVELOPMENT METHOD

Martin A. van der Hoeven, 2726 Loker Ave., West, Carlsbad, Calif. 92008

Continuation-in-part of Ser. No. 156,404, Feb. 16, 1988, Pat. No. 4,848,740. This application Jun. 1, 1989, Ser. No. 360,133

Int. Cl.[5] A63B *23/02*

U.S. Cl. 272—93 **4 Claims**



1. A method for exercising one's abdominal musculature which comprises:

assuming a seated position over a substantially horizontal structure with legs fully extended in a substantially horizontal direction;

pushing one's feet against a substantially vertical stop;

tilting one's pelvis posterially while resting the thorax forwardly against an immobile barrier, and holding one's thoracic spine area in a forwardly bent position; and

pulling and holding a horizontally tensioned tow-line with both hands, bringing one's arms to a substantially vertical position with elbows bent.

4,966,364

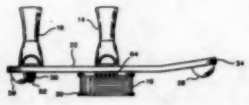
SNOWBOARD SIMULATOR

Jean-Albert Eggenberger, P.O. Box 604, Fort Langley, British Columbia, Canada (VOX 1JO)

Filed Mar. 7, 1989, Ser. No. 319,948

Int. Cl.[5] A63B *7/08*

U.S. Cl. 272—111 **7 Claims**



1. A snowboard simulator comprising an elongated board having a longitudinal axis, a front end, a rear end, a top surface and a bottom surface;

a resilient cushion disposed beneath the board proximate the middle of the board, the cushion having an upper surface;

an anuular channel on the upper surface of the cushion;

bearings located in the annular channel;

a bearing receiving frame mounted on the bottom surface of the elongated board to surround the annular channel and ride on the bearings to allow 360° rotation of the frame relative to the cushion;

a leading foot mounting unit and a trailing foot mounting unit on the top of the board, each mounting unit having a toe and heel;

pivotal means for removably mounting the foot mounting units to the board; and

means to locate the foot mounting units on the board at a first position with the toe of each foot mounting unit on one side of the board longitudinal axis or a second position with the toe of each foot mounting unit on the second side of the longitudinal axis of the board.

4,966,365

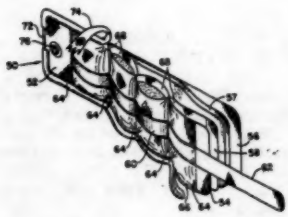
BODY EXERCISE DEVICE

Edith Winston, 135 Hazelwood Dr., Jericho, N.Y. 11753

Continuation of Ser. No. 221,036, Jul. 18, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,224

Int. Cl.[5] A63B *21/065*

U.S. Cl. 272—119 **1 Claim**



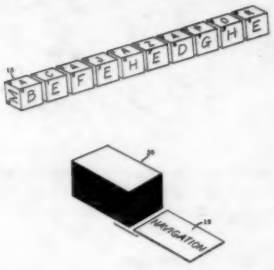
1. An exercise device adapted to be worn about the user's limb, comprising first and second outer rectangular panels defining the outside and inside surfaces of the device, respectively; an inner panel located between said outer panels, each of said panels being of the same dimensions and being aligned with each other, said inner panel being affixed only to said first outer panel along a plurality of spaced parallel lines and along the longitudinal edges of said first outer and inner panels to define a series of pockets therebetween; a foam pad of the same dimension as said outer panels located between said inner and second outer panel; and a predetermined amount of particulate matter located within each of said pockets to create a weight-generating mass of predetermined magnitude, said joined first outer and inner panels being joined to said second outer panel and pad about the peripheries thereof by an overlying band embracing the aligned edges thereof; and a fastening strap affixed to said first outer panel and extending across each of said pockets and having a free end extending beyond the end of said first outer panel, said strap being mounted to said first outer panel along each of said parallel lines of affixation between said first outer panel and said inner panel, said fastening strap having first and second contiguous complementary engagement portions adapted to interengage when the device is wrapped about the user's limb.

4,966,366

MATCHING WORD GAME EMPLOYING CUBES

Roberto Mercado-Torres, Cayey, P.R., assignor to Commonwealth of Puerto Rico, San Juan, P.R.

Filed Jun. 14, 1988, Ser. No. 206,278
Int. Cl.[5] A63F 9/00
U.S. Cl. 273—1 R 2 Claims



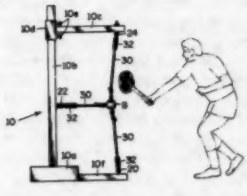
1. A matching word game comprising a set of identical six sided cubes, the number of cubes in said set being at least equal to the number of letters in a preselected word, each face of each cube bearing a different letter, some of the sides of different cubes bearing the same letter in accordance with the approximate frequency of usage of the letters in words, a plurality of cards, each bearing a preselected word composed of letters each of which appears on a face of a separate cube with said word having no more letters than the number of cubes for duplication on the exposed upper faces of the cubes when the latter are arranged by turning or locating or both in an order corresponding to the preselected word, each face of each cube also bearing a number which is the same on each face of each cube but different from every other cube in the set, and a table from which the words appearing on the respective cards are selected, said table comprising six rows of spaces arranged in columns equal to the number of cubes, the six spaces in each column bearing the letters appearing on the six sides of each cube, each letter for a selected word appearing in a different column, said columns being numbered to correspond to the number on each cube whereby each letter of each preselected word on a card has a number equivalent, no two letters appearing in any preselected work on a card having the same number equivalent.

4,966,367

BALL STRIKING PRACTICE APPARATUS

Hector A. Oyarzabal, 11130 Vance Jackson, Apt. 1402, San Antonio, Tex. 78230

Filed Aug. 28, 1989, Ser. No. 399,078
Int. Cl.[5] A63B 69/40
U.S. Cl. 273—26 E 5 Claims



1. A captive ball apparatus for practice purposes comprising:

a lower cord anchor means, an upper cord anchor means and an intermediate cord anchor means horizontally disposed from and vertically intermediate said lower and upper cord anchor means;

said three cord anchor means defining a vertical plane that will substantially bisect the body of a practicer facing said three cord anchor means and located on the horizontally opposite side of said lower and upper cord anchor means than said intermediate cord anchor means;

a practice ball; and

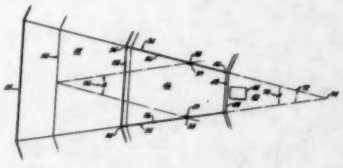
elastic cords respectively secured at one end to said practice ball and at the other end to said lower, upper and intermediate cord anchor means, thereby suspending said practice ball in said vertical plane at a selected height determined by the effective lengths of said elastic cords extending to said lower and upper cord anchor means.

4,966,368

GEOMETRIC TENNIS LANES

Victor K. Braden, 22395 Via Alonra, Coto de Caza, Calif. 92679

Continuation-in-part of Ser. No. 47,622, May 7, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 321,902
Int. Cl.[5] A63B 69/38
U.S. Cl. 273—29 A 20 Claims



15. A plurality of geometrical tennis lanes forming a circle or a semi-circle, having generally triangular configurations, connectably attached to each other, and defined by overall lengths of from about 68 feet to about 91 feet, each of said tennis lanes comprising;

(a) a base line and central target area, said central target area having three different distinct target zones, and wherein the base line and central target area are separated by a distance of from about 38 feet to about 40 feet;

(b) two separate elongated rectangular side targets, mutually spaced apart from each other, said side targets defined by a height of from about 14 feet to about 18 feet, a width of from about 4 inches to about 6 inches, a length of from about 4 inches to about 6 inches and being co-planar with the side borders of each tennis lane, wherein the location of the two separate elongated rectangular side targets of each tennis lane is defined by an angle of from about 19 degrees to about 21 degrees as measured from the center of the base line and intersecting with the side borders of the tennis lanes;

(c) a pit area adjacent to the central target area, wherein said pit area has a radius of from about 25 feet to about 30 feet;

(d) a floor area having three distinct slopes wherein the first slope has a downward incline of from about 1% to about 3%, the second slope has an incline of from about 1% to about 7%, and the third slope has a downward incline of from about 1% to about 2%.

4,966,369

POSITIVE ROTATIONAL STABILITY PUTTER

Roy N. Griffin, P.O. Box 8438, Horseshoe Bay, Tex. 78654

Filed May 23, 1989, Ser. No. 356,328
Int. Cl.[5] A63B 53/04
U.S. Cl. 273—80 A 25 Claims

23. A golf club arrangement especially suitable for use as putter, comprising:

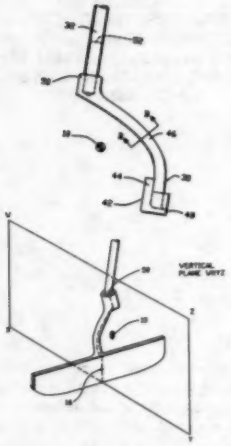
(a) an elongated shaft having a top hand gripping end and a bottom head assembly connecting end; and

(b) a head assembly including

(i) a clubhead having a striking face,

(ii) means for connecting said clubhead to the bottom end

of said elongated shaft, said connecting means further including an offset extending forward and upward from said clubhead to the bottom end of said elongated shaft, said offset neck being secured midway between a heel and a toe portion of said clubhead so as to define the center of percussion of the clubhead, said offset neck further situated so as to lie entirely within a vertical plane extending through a first point at the center of said strike face, said vertical plane being a perpendicular bisector of said strike face and a bisector of said offset neck, and



(iii) a weighted insert composed of a material denser than that of the material composing said clubhead or said offset neck, said weighted insert situated at a juncture between said offset neck and the bottom end of said elongated shaft, said juncture occurring at a second point situated in front of said clubhead;

(c) said head assembly being configured such that its center of gravity is positioned forward of said striking face of said clubhead, wherein said vertical plane further extends through said center of gravity, said second point, said connecting means and said center of percussion.

4,966,370

GOLFER'S PUTTING PRACTICE DEVICE

David Morris, Chattanooga, Tenn., assignor to Habitat International, Inc., Roosville, Ga.

Filed Jan. 22, 1990, Ser. No. 468,139

Int. Cl.[5] A63B *69/36, 67/02*

U.S. Cl. 273—176 F **20 Claims**

1. For use with a putting material having a predetermined thickness, a top surface, a bottom surface, and a circumferential edge, a ball retainer comprised of

means for removably grasping a portion of the material edge; and

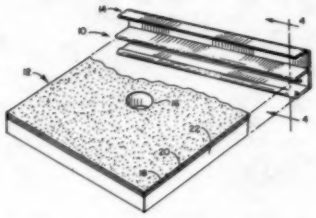
catcher means rigidly mounted to said grasping means for retainably receiving a ball having a predetermined diameter coming into contact therewith, said catcher means comprising

an elongate channel member having a substantially U-shaped cross section and including

a flexible upper arm,

a lower arm which, when said ball retainer is installed on the material, contacts the top surface thereof, and

a back connecting said upper and lower arms in a spaced apart relationship, said upper and lower arms each having a connected side attached to said back and a free side, said free sides of said upper and lower arms



being spaced apart a distance that is slightly less than the ball diameter and having a resiliency therebetween such that the ball can become engaged therebetween.

4,966,371

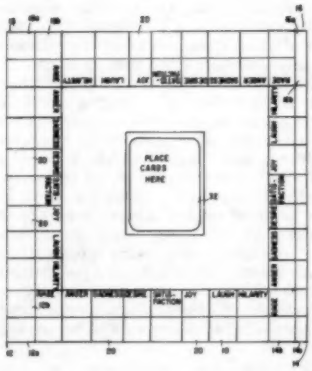
BOARD GAMES OF EMOTIONAL EXPRESSION

Jimmy L. Sherman, 1743 E. 122nd St., Los Angeles, Calif. 90059

Filed Nov. 13, 1989, Ser. No. 436,010

Int. Cl.[5] A63F *3/00*

U.S. Cl. 273—243 **9 Claims**



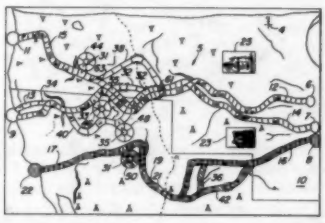
1. A game comprising a square game board having printed markings thereon defining four corner zones, and player position spaces extending along each side edge of the board between the corner zones; each corner zone being subdivided into a start space and a finish space for one player; the four start spaces and four finish spaces being marked so that each player starts from a different corner zone and moves around the circumference of the board to finish at the corner zone where he started; four player-position identifier pieces individually movable from space to space along the board; random number generating means to indicate the number of spaces that a player is required to move his position identifier piece during his turn of play; instructional markings on selected ones of the board spaces: a pack of instruction cards arranged to be individually picked up and read when a player is directed to do so by the instructional markings on the board spaces; and three fortune dice adapted to be rolled to collectively show a message to the players; a first one of said fortune dice having the initial portion of a message printed on each of its faces; a second one of said fortune dice having an intermediate portion of a message printed on each of its faces; and a third one of said fortune dice having an ending portion of a message on each of its faces; said board spaces and instruction cards having instructional markings thereon directing the players to roll the fortune dice when

an identifier piece lands on a particular board space, or when a certain card is picked up; and play money passable back and forth between the players according to the directions printed on the board spaces, instruction cards, and fortune dice.

4,966,372
BOARD GAME APPARATUS AND METHOD OF PLAYING THE GAME

James C. Robison, 550 Franklin Ave., Sellersville, Pa. 18960

Continuation-in-part of Ser. No. 66,252, Jun. 25, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 284,418
Int. Cl.[5] A63F *3/04*
U.S. Cl. 273—252 **16 Claims**



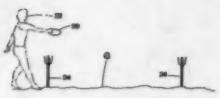
1. A game apparatus comprising in combination:
(a) a game board which provides at least three differently colored, segmented and circuitous paths which represent exploratory trails across the United States in its formative years;
(b) three sets of figures for use by opposing players of said game where each set is distinguishable by their color and each figurine of a set being further distinguishable by a different colored hat wherein a certain one of said colored figurine sets is used as markers with a correspondingly colored one of said three trails;
(c) each of said figurines representing a different explorer historically connected with said trail, and said respective players identifying themselves with the selected set of explorer in traversing the trail during the playing of the game;
(d) a die means having numerical indicia for alternative casting by said players during the course of said game wherein the number cast allows the player to incrementally traverse a selected trail in accordance with said number;
(e) means for giving a reward or penalty instructions to a player when any one of said markers lands upon any one of two different randomly positioned segments on said trail; and
(f) whereby the historic trail is traversed vicariously by said player through the persona of the selected figurine whereby the player becomes educated with respect to the early exploratory history of the United States.

4,966,373
FLYING RING

Jean C. Houle, and Lise Therrien, both of 890 St. Joseph Boulevard, West, Drummondville, Province of Quebec J2E 1H9, Canada

Filed Jul. 21, 1989, Ser. No. 383,072
Int. Cl.[5] A63B *00/00*
U.S. Cl. 273—339 **16 Claims**

1. A game of quoits in which at least one annular quoit member is to be tossed by a player at a peg member, said quoit member being lightweight, said peg member defining a fork member and support means to support said fork member at a substantially fixed position; wherein said fork member includes a central upturned prong and at least four upturned, peripheral, spaced prongs in pairs of successive prongs, the prongs of each pair consisting of the corresponding end sections of a common bent rod; said prongs being so spaced and said quoit being of



such dimension that said quoit is engageable either about one of said prongs, or concurrently about the central prong and one peripheral prong.

4,966,374
GROMMET

Ryuetsu Oikawa; Akira Ikari, and Touru Sasaki, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 286,264
Claims priority, application Japan, Dec. 16, 1987, 62-316015
Int. Cl.[5] F16L *5/02*; H01B *17/26*
U.S. Cl. 277—178 **8 Claims**

1. A grommet adopted to prevent water from leaking through the hole of a panel, comprising:
a hard portion made of a hard material and fixedly fitted in the hole of a panel; and
a soft portion made of a soft material and including an electric cord insertion part and a waterproofing part, said hard portion being composed of a plurality of split parts whose mutually coupled faces are provided with guide bars and provided with guide holes having an open and a closed end, said guide bars being respectively slidably fitted in said guide holes so that said split parts can be moved away from each other in an expansionary manner as they remain coupled to each other.

4,966,375
LATHE CHUCK FOR OFFECENTER WORKPIECE ROTATION

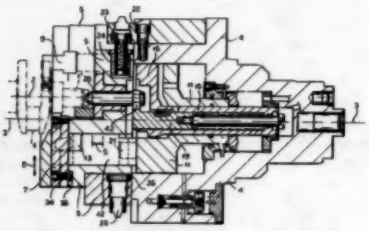
Günter H. Röhm, Heinrich-Röhm-Str. 50, D-7927 Sontheim, and Manfred Kolmberger, Keltenstrasse 11, Dillingen-Hausen, both of Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 387,173
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828162
Int. Cl.[5] B23B *5/22*
U.S. Cl. 279—6 **11 Claims**

1. A chuck comprising:
a chuck body generally centered on and rotatable about a rotation axis;
a head displaceable on the chuck body generally perpendicular to the rotation axis;
three jaws angularly generally equispaced on the head about a clamp axis offset from and substantially parallel to the rotation axis, each of the jaws being displaceable on the head generally radially of the clamp axis, two of the jaws being pivotal about respective jaw axes parallel to the clamp and rotation axes and the other jaw being displace-

able in a plane substantially including the clamp and rotation axes; and

actuator means connected to the jaws including an actuator member displaceable axially in the head and provided



with respective actuating surfaces inclined to the clamp axis and engageable with the jaws for synchronously displacing same generally radially toward and away from the clamp axis.

4,966,376

VEHICLE WHEEL SUSPENSION CLEARANCE DETECTOR

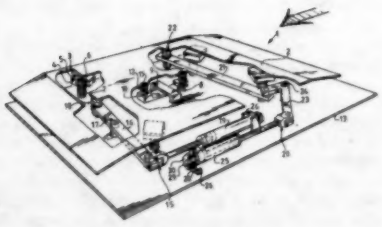
Halbe W. Scheper, No. 1, Groene Zoom, NL-9791 BA Ten Boer, Netherlands

Filed Feb. 7, 1989, Ser. No. 306,849

Claims priority, application Netherlands, Feb. 9, 1988, 8800298

Int. Cl.[5] B60F *25/00*

U.S. Cl. 280—1 **11 Claims**



1. Device for detecting clearance in the wheel suspension of a vehicle, comprising a frame, two wheel support plates mounted on said frame for rotation and movable during operation substantially in a horizontal plane, and drive means for moving said wheel support plates in opposing directions relative to one another over limited distances, characterized in that the wheel support plates are each mounted for rotation about a vertical axis and for lengthwise movement transversely of an imaginary connecting line between the two wheel support plates and that the drive means can cause these turning and lengthwise movements to occur independently of one another.

4,966,377

ROLLER SKATE

Chung-Hsiung Yu, 2F, No. 94, Chung-Yuan St., Taipei City, Taiwan

Filed Aug. 15, 1989, Ser. No. 394,111

Claims priority, application United Kingdom, Sep. 30, 1988, 8822982

Int. Cl.[5] A63C *17/14, 17/04*

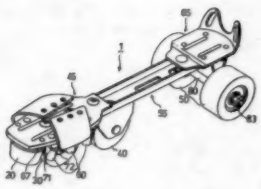
U.S. Cl. 280—11.2 **10 Claims**

1. A roller skate comprising:

a shoe base having a front portion, a rear portion, and a middle portion connected between said front portion and said rear portion;

a pair of transversely aligned rear rollers rotatably supported under said rear portion;

at least one middle roller rotatably supported under said middle portion, said middle roller being disposed at a position constituting the vertex of an isosceles triangle formed by said middle roller and said pair of rear rollers,



thus constructing a supporting plane for making contact with the ground; and

a series of rollers having a smaller diameter than said middle roller so that the lowest point of said series of rollers is substantially higher than said supporting plane, while said supporting plane is in contact with a horizontal surface, said series of rollers rotatably supported under said front portion of said shoe base and longitudinally aligned with said middle roller.

4,966,378

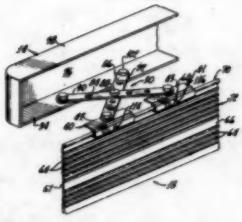
STONE SHIELD

Donald W. Cook, Downey, Calif., assignor to Elixir Industries, Gardena, Calif.

Filed Aug. 21, 1989, Ser. No. 396,425

Int. Cl.[5] B62D *25/18*

U.S. Cl. 280—154 **21 Claims**



1. A method of providing protection against stones and debris thrown rearwardly by a vehicle having a rear bumper, comprising the steps of:

providing a plurality of clips having hinge sections,

operatively securing said clips to said rear bumper at mutually laterally spaced locations along and forwardly of the bumper,

adjusting the clips toward and away from said rear bumper to place said hinge sections in mutual longitudinal alignment along the length of said bumper,

providing a stone shield having a body and a hinge section extending longitudinally along an upper edge thereof and

pivotally interconnecting said stone shield and clips by longitudinally sliding said stone shield hinge section into and through said hinge sections of said clips, whereby said stone shield is pivotally suspended from said bumper and extends longitudinally along at least part of the length of the bumper.

4,966,379

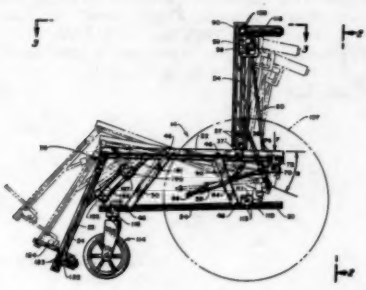
RECLINABLE WHEELCHAIR

Lawrence K. Mulholland, Ventura, Calif., assignor to Mulholland Designs, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 109,777, Oct. 19, 1987, abandoned. This application Feb. 16, 1988, Ser. No. 155,998

Int. Cl.[5] B62D *63/02*

U.S. Cl. 280—242.1 **27 Claims**



1. In a wheelchair having two spaced-apart laterally aligned structurally independent sideframe structures which cooperatively support wheelchair wheels, a seat and backrest; each one of said sideframe structures comprising:

a base frame section;

an angularly adjustable seat section connected to said base section by brace means comprising a first brace member pivotally connecting a back portion of said base section with said seat section and a second brace member pivotally connecting a forward portion of said base section with said seat section whereby each brace member provides a dual axis of rotation for movement of said seat section; and,

a seat extender means interconnecting one of said brace members and said seat section having a seat housing through which extends a movable seat shaft including a seat locking means for releasably securing said shaft whereby said seat section can be moved to a desired position and be releasably maintained at said position by said locking means.

4,966,380

DRIVING WHEEL FOR A BICYCLE OR THE LIKE, INCLUDING A SENSOR FOR MEASURING THE TRANSMITTED TORQUE, AND A BICYCLE EQUIPPED WITH SUCH A WHEEL

Jean-Pierre Mercat, Chateau-Renault, France, assignor to STE Look rue de la Pigue, France

Filed Apr. 25, 1989, Ser. No. 343,946

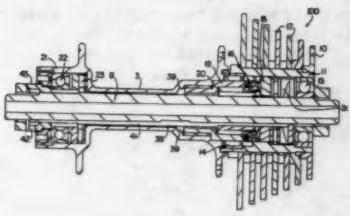
Claims priority, application France, May 17, 1988, 88 06567

Int. Cl.[5] G01L *3/14;* **B62M** *1/02*

U.S. Cl. 280—259 **10 Claims**

1. A driving wheel for a bicycle or the like, in which a mechanism for driving a hub of said wheel, utilizing a sprocket(s) receiving a driving chain, comprises a device for measuring the transmitted torque or a magnitude associated therewith, said wheel being characterized in that:

there is provided between a first member (**15, 15a**) driven in rotation by the sprocket(s) (**10, 12**) and a second member (**16, 16a**) axially slidable on the fixed axle (**8**) of the hub (**3**) and rotatably coupled with said first member (**15, 15a**) and with the hub (**3**), at least one cam (**27**) adapted for causing an axial thrust which tends to move apart said two members as a result of the rotation imparted to said members, and in that means (**29**) for sensing the value of a thrust strain are arranged in registry with one of said members, said sensing means (**29**) being carried by a non-rotating part and being connected to a measuring system adapted for determining, from the data issuing from said sensing



means, the value of the driving torque applied to said wheel, or of another magnitude associated therewith.

4,966,381

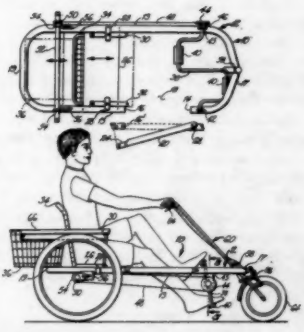
ADULT TRICYCLE

Roger H. Feikema, 1602 54th St. West, Bradenton, Fla. 34209

Filed Jun. 22, 1989, Ser. No. 369,843

Int. Cl.[5] B62K *5/06*

U.S. Cl. 280—261 **2 Claims**



1. A tricycle comprising:

a steering handle operably connected to a front wheel;

a tubular frame having spaced first and second sides and spaced front and rear portions and generally horizontally disposed and supported above the ground by spaced rear wheels and said front wheel, said rear wheels operably connected for rotation to, and positioned nearer to said rear portion, said front wheel operably connected to said front portion for both rotation and steering of said tricycle by said steering handle;

a seat connected to a mid-portion of said frame;

a front pedal drive axle operably connected between said first and second sides;

a foot crank connected for driving rotation of said drive axle;

a chain drive operably connected between said drive axle and one of said rear wheel for propelling said tricycle over ground in response to foot rotation of said foot crank;

said chain drive positioned in close proximity to one of said frame sides;

said frame forwardly extending along said first side from said drive axle to said front portion and around to said second side, then rearwardly to and around said rear portion and forwardly along said first side said first side terminating forward of one said rear wheel and rearward

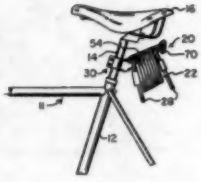
of said drive axle providing a frame opening in said first side for ingress and egress.

4,966,382

BICYCLE ACCESSORY FOR CARRYING A SHACKLE

Vincent B. Giles, 2910 Shady Hollow W., Boulder, Colo. 80302

Filed May 8, 1989, Ser. No. 349,401
Int. Cl.[5] B62J *11/00*
U.S. Cl. 280—288.4 **22 Claims**



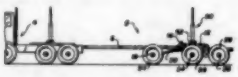
1. A bicycle accessory comprising in combination:
means for attaching the accessory to a bicycle;
means for carrying a coiled shackle, said coiled shackle carrying means connected to and carried by said attaching means, said coiled shackle carrying means including a first elongated arm, said first elongated arm including an upper surface positioned and adapted to receive and carry a coiled shackle, a first end proximal to said attaching means, and a second end opposed to said first end and distal to said attaching means; and
means for releasably securing a coiled shackle to said upper surface of said fist elongated arm, said coiled shackle securing means connected to and carried by said attaching means and including a second elongated arm extending substantially along, but spaced above, said first elongated arm to form therewith a clip adapted to receive and secure a coiled shackle between said first and second elongated arms, said second elongated arm including a first end proximal to said attaching means, a second end opposed to said first end and distal to said attaching means, and a lower surface positioned and adapted to press and secure a coiled shackle against said upper surface of said first elongated arm.

4,966,383

LOGGING TRAILER

Harold Sjostrom, 4815 Abo Road, R. R. No. 3, Ladysmith, British Columbia V0R 2E0, Canada

Filed May 9, 1989, Ser. No. 349,565
Int. Cl.[5] B60P *3/40*
U.S. Cl. 280—404 **11 Claims**



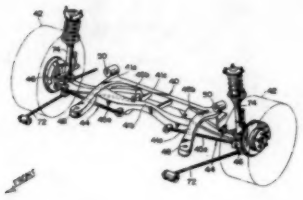
1. An extended trailer to attach to a tractor and comprising:
a main reach;
means formed at the end of the main reach to attach to a tractor;
a bridge extending over the main reach;
a forward axle for the extended trailer;
steerable mountings for wheels on the forward axle, the mounting having castor and camber;
resilient means extending forward from the bridge to the forward axle;
an intermediate axle on the extension;
a rear axle on the extension; and
a subframe carrying the intermediate and rear axles pivotally attached to the bridge.

4,966,384

SUSPENSION MEMBER MOUNTING STRUCTURE

Terumasa Endo, Nagoya; Hiroshi Naruse, Toyota; Hideo Nagaya, Toyota; Hideaki Tsushima, Toyota; Isamu Koyama, Toyota, and Yoji Matsumoto, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed May 2, 1989, Ser. No. 346,463
Claims priority, application Japan, May 8, 1988, 63-60749
Int. Cl.[5] B60G *13/00, 11/10*
U.S. Cl. 280—688 **8 Claims**



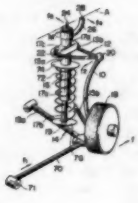
1. A suspension member mounting structure for mounting on a vehicle body a suspension member, with which left and right suspension arms each supporting a wheel are connected, through a front cushion group having at least one cushion mount attached to at least one position of said suspension member in front of a rotary axis of said wheels and a rear cushion group having at least one cushion mount attached to at least one position of said suspension member behind the rotary axis of said wheels, wherein each cushion mount of one of said front and rear cushion groups is disposed to have a first hole, through which connecting means extends, extending vertically of the vehicle body and each cushion mount of the other is disposed to have a second hole, through which connecting means extends, extending longitudinally of said vehicle body and wherein said cushion mounts are arranged such that the vehicle will, when turning, have an understeer characteristic by setting the suspension member to a steered condition centering around the cushion mount having said second hole.

4,966,385

DOUBLE WISHBONE TYPE SUSPENSION

Takashi Iwasaki, Susono, and Hiroshi Shimomura, Suzono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Apr. 13, 1989, Ser. No. 337,553
Claims priority, application Japan, Apr. 13, 1988, 63-88913
Int. Cl.[5] B60G *3/20*
U.S. Cl. 280—698 **8 Claims**



1. A double wishbone type suspension comprising:
a wheel carrier;

a lower control arm having one end swingably connected to the wheel carrier and the other end swingably connected to a vehicle body;

a shock absorber having a shell and a piston rod projecting from the shell, one of the shell and piston rod being connected to the vehicle body through a support having an elastic cushion and the other of said shell and piston rod being swingably connected to one of said wheel carrier and lower control arm; and

an upper control arm having one end swingably connected to said wheel carrier and the other end swingably connected to either one of said shell and piston rod of said shock absorber, the one being connected to the vehicle body and moved relatively to the other of said shell and piston rod connected to the lower arm when a tire supported by the wheel carrier bounds.

4,966,386

TORSION SPRING BAR AXLE FOR VEHICLE TRAILERS

Anton Werdich, Bibertal, Fed. Rep. of Germany, assignor to Alois Kober KG, Kötz, Fed. Rep. of Germany

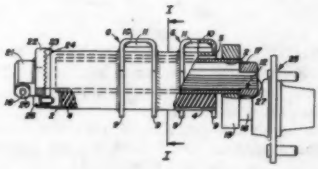
PCT No. PCT/EP87/00358, § 371 Date Mar. 8, 1989, § 102(e) Date Mar. 8, 1989, PCT Pub. No. WO88/00534, PCT Pub. Date Jan. 28, 1988

PCT Filed Jun. 1, 1987, Ser. No. 302,746

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1986, 8619274[U]

Int. Cl.[5] B60G *3/00*

U.S. Cl. 280—700 **18 Claims**



1. Torsion spring bar axle of vehicle trailers, comprising a single wheel swing lever mounted on a hollow torsion rod, said hollow torsion rod being supported in peripheral direction in a hollow and prismatic axle tube by means of strand shaped rubber bodies, the hollow and prismatic axle tube being fixedly connected to the trailer frame and the hollow torsion rod extends from the axle tube without contact by a steel torsion rod, said steel torsion rod being connected rotationally rigid to the wheel swing lever on one side and connected to the axle tube on the other side,

each of said rubber bodies being positioned between concave indentations formed in the the hollow torsion rod, and positioned between facing, fitting edge areas formed in the axle tube, said steel torsion rod being axially secured at one end in a first hub of the associated wheel swing lever, and at another end mounted rotationally rigid in a second hub which comprises a first toothed flange, second toothed flange being an integral part of the axle tube each of the toothed flanges being connectable by screws in a twisted position with regard to one another.

4,966,387

SUPPLEMENTAL SUSPENSION SYSTEM AND METHOD FOR SUPPLEMENTING THE SUSPENSION SYSTEM OF A VEHICLE

Thomas E. White, IV, P.O. Box 386, Haughton, La. 71037-0386

Filed May 31, 1989, Ser. No. 359,636

Int. Cl.[5] B60G *11/46*

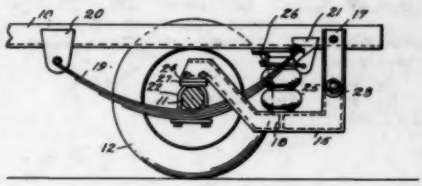
U.S. Cl. 280—712 **12 Claims**

1. In a vehicle having an axle, wheels rotatably disposed on the axle, a frame and a suspension system for mounting the axle onto the frame, a supplementary air suspension system damping the movement of the axle with respect to the frame, comprising:

a. first and second suspension frame members having front and rear ends;

b. a cross member for connecting the two frame members;

c. hanger means for pivotally suspending the rear ends of the frame members from the frame of the vehicle;



d. mounting means for mounting the front ends of the frame members in a resting position on top of the axle; and

e. air suspension means for operably connecting a portion of the suspension frame members disposed between the front and rear ends of the members to the vehicle frame.

4,966,388

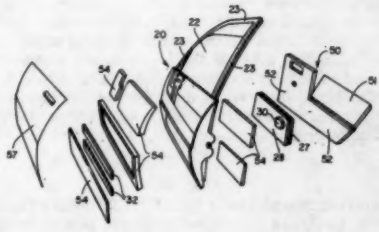
INFLATABLE STRUCTURES FOR SIDE IMPACT CRASH PROTECTION

Charles Y. Warner; Charles E. Strother, both of Orem, Utah; Donald E. Struble, Phoenix, Ariz., and Milton G. Wille, Provo, Utah, assignors to Collision Safety Engineering Inc., Orem, Utah

Filed May 25, 1989, Ser. No. 356,533

Int. Cl.[5] B60R *21/16, 21/00*

U.S. Cl. 280—730 **26 Claims**



1. An inflatable protective system which provides cushioning and containment of an occupant of a vehicle from side impact of the vehicle by another object, wherein the vehicle has a side panel assembly located adjacent to the end of a seat upon which the occupant to be protected is seated, said side panel assembly containing a window and window opening at the upper end thereof, a window frame and a roof rail adjacent to an upper side of said window, said system comprising

an inflatable bag foldable into a collapsed, relatively compact configuration and inflatable to form a substantially broad, planar air cushion having dimensions sufficient to extend over the window opening in said side panel assembly;

means for storing the folded bag within the side panel assembly at a location below said window, with the folded bag being stored in a position facing a flank of the occupant's torso when the occupant is seated on the seat;

inflator means mounted within the side panel assembly and in flow communication with said bag; and

impact sensor means mounted within said side panel assembly, said sensor means being capable of activating said inflator means to inflate said bag when another object

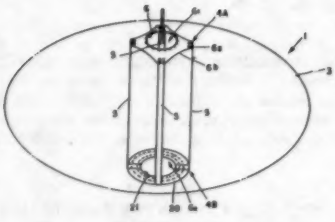
impacts said side panel assembly with a predetermined force, with the inflated bag forming a shock absorbing cushion for the head and upper torso of the occupant and a cushioning barrier to restrain the occupant's head and neck from moving into the window opening or of striking the window frame and roof rail.

4,966,389

INFLATABLE AIR BAG FOR PROTECTION OF A VEHICLE OCCUPANT

Juichiro Takada, No. 12-1, Shinmachi 3-Chome, Setagaya-ku, Tokyo, Japan

Filed Mar. 27, 1989, Ser. No. 328,968
Int. Cl.[5] B60R *21/16*
U.S. Cl. 280—743 **1 Claim**



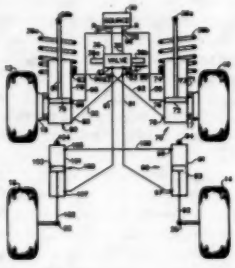
1. An inflatable air bag for protection of a vehicle occupant by absorbing the secondary impact of the occupant as he or she is thrown forward by inertia and having a first fastening member at the gas inflow side, a second fastening member at the impact side and a plurality of inflation-controlling members connected between the fastening members at junctures therewith, characterized in that at least the portions of the first fastening member forming the junctures with the inflation-controlling members are resilient so that they absorb energy and reduce the impact forces exerted on the inflation-controlling members when they arrest the movement of the impact side of the air bag during inflation, the first fastening member being composed of at least one woven fabric sheet which is positioned such that the portions thereof at the junctures are oriented on a bias to the directions of the impact forces exerted on the inflation-controlling members.

4,966,390

ANTI-ROLL SYSTEM WITH TILT LIMITATION

Mark A. Lund, and Genevieve Garrabrant, both of Escondido, Calif., assignors to Tilt Limitation Control, San Diego, Calif.

Filed Aug. 23, 1989, Ser. No. 397,723
Int. Cl.[5] B62D *9/02*
U.S. Cl. 280—772 **22 Claims**



1. A system for roll compensation in a vehicle having front and rear wheels, a frame with means for rotatably supporting said wheels, a vehicle body, and a suspension, said system comprising:

valved hydraulic signal means for providing a differential hydraulic signal indicative of vehicle turn direction, said differential hydraulic signal including a pressurizing hydraulic potential and a return hydraulic potential;

a pair of rear wheel hydraulic cylinder and piston assemblies acting between said body and said rear wheels;

a pair of front wheel hydraulic cylinder and piston assemblies acting between said body and said front wheels;

a hydraulic circuit connected to said valved hydraulic signal means and to said rear wheel and front wheel cylinder and piston assemblies for conducting said differential hydraulic signal to said rear wheel and front wheel cylinder and piston assemblies by providing said pressurizing hydraulic potential to move the pistons in a first rear wheel and a first front wheel cylinder and piston assembly while providing said return potential to move the pistons in the second rear wheel and the second front wheel cylinder and piston assemblies;

a hydraulic conductor directly connecting corresponding ends of said rear wheel cylinder and piston assemblies for hydraulically conducting between said rear wheel cylinder and piston assemblies in response to conduction of said differential hydraulic signal to said rear wheel cylinder and piston assemblies; and

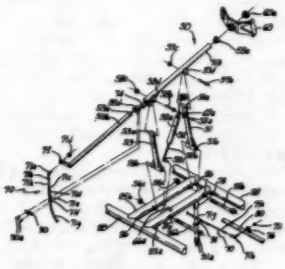
tilt-limitation means connected to said hydraulic circuit for limiting the maximum displacement of the pistons in said front wheel cylinder and piston assemblies by return conduction of said pressurizing hydraulic potential.

4,966,391

IMPACT-ABSORBING AMUSEMENT VEHICLE

David W. Sobodos, Hermosa Beach, and David W. Chalmers, San Pedro, both of Calif., assignors to Agajanian's Ascot Slic Trac, Inc., Gardena, Calif.

Division of Ser. No. 38,655, Apr. 15, 1987, Pat. No. 4,838,592.
This application Apr. 3, 1989, Ser. No. 332,869
Int. Cl.[5] B62D *1/18*
U.S. Cl. 280—777 **6 Claims**



1. An impact-absorbing steering assembly, mounted to a vehicle frame and attached to steered wheels, including an impact-absorbing steering column comprising:

a. a steering column mast having forward and rearward ends;

b. a first pivot joint attached to said steering column mast at said rearward end;

c. a second pivot joint attached to said steering column mast at said forward end;

d. a third pivot joint attached to said vehicle frame;

e. a fourth pivot joint attached to said vehicle frame forward of said third pivot joint;

f. a fifth pivot joint attached to said vehicle frame between said third pivot joint and said fourth pivot joint;

g. a first connecting member, having upper and lower ends,

pivotally attached at said upper end to said first pivot joint and pivotally attached at said lower end to said third pivot joint;

h. a second connecting member, having upper and lower ends, pivotally attached at said upper end to said second pivot joint and pivotally attached at said lower end to said fourth pivot joint;

i. a sixth pivot joint attached to said first connecting member at said upper end of said first connecting member;

j. a damper attached to said first connecting member at said sixth pivot joint and attached to said frame at said fifth pivot joint; wherein said steering column moves forward when an impact force is applied causing said damper to be compressed and returns to its original configuration upon removal of said force.

4,966,392

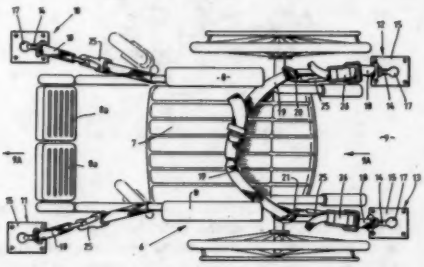
WHEELCHAIR AND OCCUPANT RESTRAINTS

Robert J. Feston, East Keilor; James W. Fowler, Springvale, and Barry J. Miles, East Keilor, all of Australia, assignors to Australian Mobile Tech Corporation Pty. Ltd., Keilor-Victoria and Freight Lok Pty. Ltd., Springvale-Victoria, both of, Australia

Filed May 9, 1989, Ser. No. 349,103

Int. Cl.[5] B60N *1/02*; A61G *5/00*

U.S. Cl. 280—801 **6 Claims**



1. A safety harness for a wheelchair/occupant system to be transported on a movable platform liable to sudden stoppage or other potentially dangerous rearward impulse, the platform having associated therewith rear anchor means to which the harness is adapted to secure the system, said harness including a lap belt for the occupant and on each side of the chair a buckle providing a connexion movable relative to the system, said buckle being connected to a respective end of the lap belt, a rear anchor strap for pulling the buckle downwardly and rearwardly, the anchor strap having a forward end connected to the buckle and a rearward end with fastener means for connecting same to said anchor means, and a holding strap associated with the anchor strap and connected to a forward part of the buckle via a chair part for pulling the buckle forwardly in response to decelerating forces applied direct to the chair via the holding strap.

4,966,393

BUCKLE STALK FOR SEAT BELT SYSTEM

Osamu Tokugawa, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 305,086

Claims priority, application Japan, Feb. 8, 1988, 63-14617[U]; Nov. 25, 1988, 63-153087[U]

Int. Cl.[5] B60R *22/22*

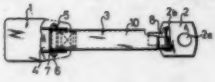
U.S. Cl. 280—801 **10 Claims**

1. A buckle stalk for a seat belt system, comprising:

(a) an anchor member adapted to be fastened to a vehicle body, said anchor member defining a slot;

(b) a buckle adapted for releasably holding one end of a seatbelt strap;

(c) a stalk member connecting aid anchor member and said buckle, said stalk member including an elongated webbing having at its opposite ends a pair of folded-back portions, and a cover covering a majority of said webbing and formed integrally with said webbing, one of said folded-back portions extending through said slot of said anchor member and the other being supported on a base of said buckle; and



(d) a support member attached to said anchor member, provided between said anchor member and one of said folded-back portions of said webbing and having an extension which extends longitudinally from said slot beyond a buckle-side end edge of said anchor member to make said stalk member self-supporting, said support member being embraced by said webbing and said cover in a unitary form therewith.

4,966,394

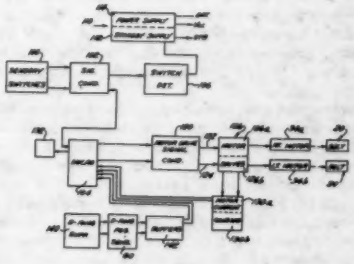
AUTOMOTIVE PASSIVE COMFORT SEAT BELT SYSTEM

Rudy V. Thomas, Sterling Hgts., and Kenneth S. Towers, Royal Oak, both of Mich., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Aug. 31, 1989, Ser. No. 401,217

Int. Cl.[5] B60R *21/10*

U.S. Cl. 280—807 **23 Claims**



1. A safety restraint system for a vehicle comprising:

a safety belt attachable at one portion thereof to a buckle means, the buckle means comprising a tongue portion attached to a safety belt and a buckle for receiving the tongue, first sensor means is provided for generating a first signal indicative of a buckled and an unbuckled state;

D-ring means adapted to be rotatably mounted to a vehicle member, for slideably receiving a shoulder belt portion of the safety belt;

second sensor means, coacting with the D-ring means for generating a second signal indicative of D-ring motion;

retractor means adapted to be secured to a structure member of the vehicle, including a take-up spool, attached to an end of the shoulder belt and a reversible electric motor, in driving engagement with the take-up spool for rotating same in rewind and reverse directions in response to rewind and reverse control signals;

third means for generating a third signal indicative of motor torque;

control logic means for generating the rewind and reverse control in response to the states of the first and second

sensor means including first storage means, responsive to the second signal, for storing a value indicative of D-ring position.

4,966,395

RIGID OR FLEXIBLE COUPLING FOR PIPES

Thomas R. Hendrickson, Elo, Mich., assignor to Quikcoup, Incorporated, Southfield, Mich.

Filed Aug. 11, 1989, Ser. No. 392,662
Int. Cl.[5] F16L *17/04*
U.S. Cl. 285—12 **12 Claims**

1. A pipe coupling for either rigidly or flexibly connecting the adjacent ends of a pair of aligned pipes with abutment means thereon, comprising:

a circular casting for encircling adjacent pipe ends and formed of a pair of generally coplanar, aligned, semicircular segments;

radially outwardly extending projections are formed on the opposite ends of the segments and are aligned with the adjacent projections of the opposite segment;

at least one pair of adjacent projections are provided with aligned bolt receiving holes which are partially enlarged sockets that open towards each other;

a bolt extending through the aligned bolt holes and enlarged sockets and having a nut-like fastener for bolting the projections together for causing the segments to clamp radially inwardly against the aligned pipe ends which the casing encircles for connecting the pipe ends together with some limited degree of relative movement permissible;

a double ended plug having opposite end portions which are each removably positioned within one of the sockets and which is shaped to closely fit within such sockets;

said plug having a generally central bolt hole through which said bolt extends and is closely fitted;

and with the plug end portions being slightly offset relative to each other in a generally axial direction relative to the coupling axis, so that tightening of the nut causes the plug to position the projections apart in a generally axial direction which causes the segments to shift moving apart in a generally axial direction for clamping the segments against the abutment means of said pipes in both axial and radial directions for rigidly coupling the pipe ends together.

4,966,396

CONNECTION DEVICE

John F. Dye, Bridgewater, Mass., assignor to Kendall Company

Filed Apr. 13, 1989, Ser. No. 337,606
Int. Cl.[5] F16L *39/00*
U.S. Cl. 285—136 **8 Claims**

1. A connection device, comprising:

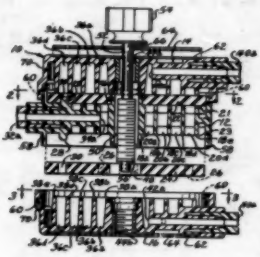
an intermediate member having a pair of opposed first and second sides, and a plurality of spaced annular walls defining a plurality of separate annular channels extending substantially peripherally around the intermediate member;

first and second walls covering the opposed first and second sides of the intermediate member and closing and sealing the channels of the intermediate member, with each of the walls having opening means extending therethrough and separately communicating with each of the channels of the intermediate member;

a plurality of first conduits separately communicating with each of the channels of the intermediate member to permit passage of fluid to [illegible] channels;

a first connection positioned adjacent said first wall and having a plurality of annular walls defining separate annular channels extending substantially peripherally around the first connector, with each of the channels of the firs connector separately communicating with the opening means of the first wall such that the channels of the first connector separately communicate with said channels of the intermediate member, with said first connector being rotatable with respect to the intermediate member and with the first wall closing and sealing the channels of the first connector;

a plurality of second conduits separately communicating with each of the channels of the first connector to permit passage of fluid from said channels;



a second connector positioned adjacent said second wall and having a plurality of annular walls defining separate annular channels extending substantially peripherally around the second connector, with each of the channels of the second connector separately communicating with the opening means of the second wall such that the channels of the second connector separately communicate with said channels of the intermediate member, with said second connector being rotatable with respect to the intermediate member, with the second wall closing and sealing the channels of the second connector;

a plurality of third conduits separately communicating with each of the channels of the second connector to permit passage of fluid from said channels such that the first conduits separately communicate with the second and third conduits at the rotatable positions of the first and second connectors including means for releasably securing the first connector, intermediate member, and second connector together to permit relative rotation thereof.

4,966,397

FLEXIBLE PIPE SADDLE

Robert M. McKinnon, P.O. Box 648, Bedford, Tex. 76021-0648

Filed Sep. 1, 1989, Ser. No. 401,990
Int. Cl.[5] F16L *5/00*
U.S. Cl. 285—197 **20 Claims**

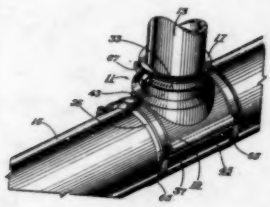
1. A saddle device for use in tapping into a first pipe with a second pipe, comprising:

(a) a fitting portion having an outer end and an inner end, said fitting portion having a passage extending between said outer and inner ends, said fitting portion outer end being adapted to receive said second pipe;

(b) a coupling portion integral to said fitting portion inner end, said coupling portion having an arcuate inner surface for contacting the outside diameter of said first pipe, said

inner surface having an opening that communicates with said passage of said fitting portion;

(c) said coupling portion having a circumferential edge portion on each side of said fitting portion and a connecting edge portion on each side of said fitting portion, said circumferential edge portions having a curvature similar to said inner surface curvature and being adapted to fit around part of the circumference of said first pipe, said circumferential edge portions being adapted to receive means for retaining said saddle device onto said first pipe, said connecting edge portions extending between said circumferential edge portions;



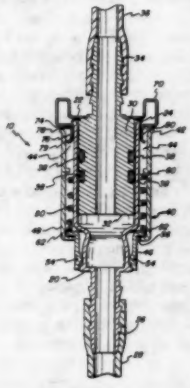
(d) said saddle device being made of an elastomeric material so as to be flexible, wherein said coupling portion can be flexed so as to both increase or decrease the curvature of said inner surface so that said saddle device can be fitted onto a variety of pipe sizes, said connecting edge portions having respective stiffening means extending between said circumferential edge portions, said stiffening means being made of a material that is stiffer than said elastomeric material so as to inhibit bowing of said connecting edge portions when the curvature of said inner surface is increased.

4,966,398

FLUID CONDUIT COUPLING

Francis C. Peterson, Woodbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.

Filed Feb. 14, 1989, Ser. No. 310,838
Int. Cl.[5] F16L *39/00*
U.S. Cl. 285—319 **5 Claims**



1. A coupling for connecting a pair of fluid conduits, comprising:

a female coupling body having a flanged open end;

a male coupling body having an inserting end sized to be inserted into said open end of said female coupling body;

a jacket mounted on said female coupling body having an open end directed towards said flanged end of said female coupling body, said jacket surrounding said female coupling body with a space therebetween, and being axially moveable relative thereto;

means biased to position said jacket relative to said female coupling body with said jacket open end adjacent to said female coupling body flanged end; and

a resilient locking element mounted on said male coupling body including

(a) two shorter fingers each having

(i) an inwardly directed segment directed toward said male coupling body,

(ii) an axially directed segment directed along said male coupling body toward said inserting end, said axially directed segment being sized and adapted for insertion into said jacket open end and to fit inside said space between said jacket and said female coupling body, and

(iii) an angular union between said inwardly directed segment and said axially directed segment, said angular union being sized and adapted to engage said flanged end of said female coupling body, and

(b) two longer fingers each having

(i) an offset segment directed along said male coupling body towards said inserting end of said male coupling body which is adapted for insertion into said jacket open end and to fit inside said space between said jacket and female coupling body,

(ii) an inwardly directed segment directed toward said male coupling body connected to said offset segments,

(iii) an axially directed segment directed along said male coupling body toward said inserting end thereof, said axially directed segment being sized and adapted for insertion into said jacket open end and to fit inside said space between said jacket and said female coupling body, and

(iv) an angular union between said longer finger inwardly directly segment and said longer finger axially directed segment, said angular union being sized and adapted to engage said flanged end of said female coupling body, and

(c) spring means for permitting limited axial movement of said coupling bodies relative to each other and for resiliently resisting pull apart forces on said coupling when said coupling bodies are secured together;

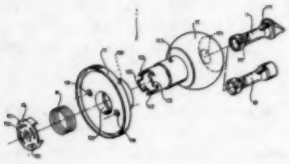
whereby said coupling may be secured together by moving said jacket away from said flanged end of said female coupling body, inserting said male coupling body inside said female coupling body with said shorter and longer fingers located adjacent said female coupling body, releasing said jacket so that the bias means locates said jacket in its biased position with said shorter and longer fingers located inside said space between said jacket and said female coupling body such that said male and female coupling bodies resist separation by the engagement of said angular unions with said flanged end of said female coupling body and said fingers are prevented from radial outward movement by said jacket, and whereby said coupling may be disconnected by moving said jacket away from said flanged end of said female coupling body and pulling said female coupling body and said male coupling body apart when said fingers are released from said space between said jacket and said female coupling body.

4,966,399

LOCK SET WITH SPINDLE LOCK

Jui C. Lin, 297, Bor Ay Rd., Kaohsiung, Taiwan

Filed Apr. 19, 1989, Ser. No. 340,753
Int. Cl.[5] E05C *21/00*
U.S. Cl. 292—359 **3 Claims**



1. A spindle lock comprising;

an inside knob provided with a grip having a central round hole for fixing a turning button therein, said turning button having a protrusion sticking at the round hole and an inside oblong hole for one end of a long flat moving rod to stick in, said grip having moving petals at a tubular end to engage with an inside moving plate combined with a square shaft for mutual movement;

an outside knob provided with a grip having a tubular end fitting with a replacing plate, which has a square hole, a square shaft in the end fitting and passing through the square hole for mutual movement of the shaft and fitting, said outside knob grip having its tubular portion fitting in a shaft hole of an outside knob cap, said shaft hole provided with two symmetrical placing notches, two limit plates carried by the moving rod and located in the placing notches, said limit plates being also covered by an inner cap having a peripheral aperture, said long flat moving rod having one end fixed in a key hole block in the outside knob and the other end connected with the turning button of the inside knob; and

said long flat moving rod capable of being revolved by the turning button to move the limit plates up and down, said limit plates being retracted within the inner cap and located in the shaft hole of the outside knob cap when they are moved down, said limit plates sticking in the peripheral aperture of the inner cap blocking the outside grip from revolving when they are moved up.

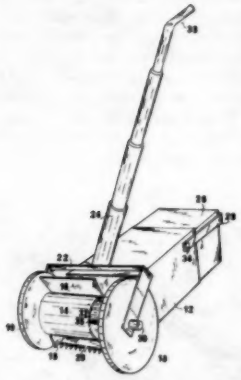
4,966,400

DEVICE FOR REMOVAL OF ANIMAL DROPPINGS AND DEBRIS

Harold L. Hull, 401 Canyon Way, SP 43, Sparks, Nev. 89434, and Alan Gross, 3445 Rocky Ridge Blvd., Sparks, Nev. 89431

Filed Jun. 29, 1989, Ser. No. 373,193
Int. Cl.[5] A01K *29/00*; C01H *1/12*
U.S. Cl. 294—1.4 **2 Claims**

1. A device for use in gathering and removing animal waste and other debris comprising: a handle, pivotable means to attach said handle to a shaft, said shaft having a wheel affixed to each of its ends, said shaft supporting a raking means, said shaft supporting a collection chamber, said shaft supporting a feces or debris striker means, said collection chamber supporting a releasable, disposable container, said striker means being a split, helically shaped tube having an inner and an outer edge, said tube having a memory, with the length of said tube being less than the inside dimensions of said collection chamber, means to fasten said inner edge of said tube to said shaft, said outer edge having a substantially right angle bend, said outer end forming said striker means, said handle, said shaft, said raking means, said collection chamber, said striker means and said releasable container cooperating together to collect and



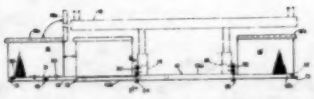
deposit said animal waste and other debris into said releasable container, when said wheels and said shaft are rotated.

4,966,401

EXTENSION GLIDE SYSTEM FOR MOUNTING TRUCK STORAGE BOX

Scott G. Dutro, 17002 NE. 172nd Pl., Woodinville, Wash. 98072, and Terry D. Dutro, 10711 SE. 30th, Bellevue, Wash. 98004

Filed Nov. 14, 1988, Ser. No. 271,014
Int. Cl.[5] B60R *11/06*
U.S. Cl. 296—37.6 **10 Claims**



1. A storage box mounting system for mounting a storage box to a pair of main frame beams of a vehicle chassis which comprises a pair of storage box mounting assemblies adapted to be fastened transversely to the vehicle main frame beams and protrude outward from one side whereby a storage box may be stowed along an outer side of one of the vehicle main frame beams, each mounting assembly comprising: a mounting tube attachable to the vehicle main frame beams and having a sufficient length to extend therebetween and to further extend laterally outward from one of the main frame beams to carry a glide channel for telescopic movement within an interior guideway therein between extended and retracted positions, said mounting tube having a first portion of a length to extend between the vehicle main frame beams, and having a second portion of a length to extend beyond the vehicle main frame beams; a glide channel telescopically contained in said mounting tube and having a sufficient length to be supportably contained within said interior guideway in said mounting tube when protruding longitudinally outward, with respect to the mounting tube containing said glide channel, to carry the storage box; said mounting tube first portion being adapted to contain an inner end of said glide channel, and said mounting tube second portion being open-topped whereby said glide channel protrudes above the mounting tube open-topped second portion so that a storage box set upon said glide channel may overlay said mounting tube second portion when said glide channel is positioned in the retracted position; said mounting tube having a first rotating bearing means located in

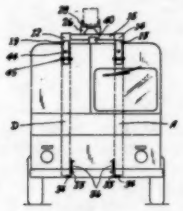
a distal end of said second portion for supporting said glide channel; said glide channel having a second rotating bearing means located at the inner end and adapted to contact the interior guideway of said mounting tube for support therein when said glide channel is telescopically extended and retracted in said mounting tube; and vehicle mounting means for attaching each mounting tube to the vehicle main frame beams whereby the storage box may be stored in the retracted position overlaying the mounting tube second portion and may be transported outward from the vehicle by sliding the glide channels telescopically outward from within their respective mounting tubes.

4,966,402

AERIAL LIFT SUPPORT FRAME

James Robertson, 6401 East Rogers Cir., Suite 1, Boca Raton, Fla. 33487

Filed Apr. 21, 1989, Ser. No. 341,582
Int. Cl.[5] B66C *23/06*
U.S. Cl. 296—43 **5 Claims**



1. A wide-stanced table mount type support frame for supporting an aerial lift apparatus on a carrier vehicle, said carrier vehicle comprised in part of a vehicle body supported by horizontal rail frame members, the support frame comprising:

a generally elongated rectangular frame means adapted for connection between said aerial lift apparatus and a carrier vehicle means for transporting said aerial lift apparatus;

a plurality of leg means extending generally vertically downwardly from said rectangular frame means;

a corresponding number of generally vertically disposed stanchions adapted to receive said leg means in releaseable engagement, said stanchions being rigidly affixed to the body and horizontal rail frame members of said carrier vehicle;

means for releasably connecting said leg means to said stanchions;

wherein said stanchions are spaced apart from front to rear and from side to side with respect to said vehicle a generally substantial distance relative to the length overall and the longitudinal center line of the vehicle respectively; and

means for rigidly affixing said stanchions to said carrier vehicle frame comprising:

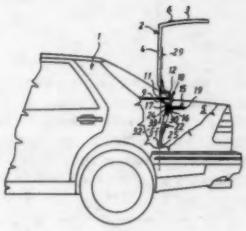
a flange plate having a vertical portion sandwiched essentially vertically between the lower portion of each said stanchion and a corresponding one of said rail frame members, said flange plate further having a first tab projecting essentially horizontally from said flange plate in a direction away from the longitudinal centerline of said carrier vehicle frame, said first tab extending under the bottom of said stanchion thereby supporting said stanchion, a second tab connected at a point vertically above said first tab but on the opposite side of said flange plate relative to said first tab, said second tab projecting essentially horizontally away from said flange plate in a direction toward the longitudinal center-line of said carrier vehicle, said corresponding one of said rail frame members extending beneath said second tab for supporting said flange plate, and fastener means for fixedly securing said flange plate and said stanchion to said corresponding one of said rail frame members.

4,966,403

ARRANGEMENT FOR SUSPENSION OF A DOOR ON A VEHICLE BODY

Orvar Nordström, Trollhättan, Sweden, assignor to Saab-Scania Aktiebolag, Sweden

Filed Apr. 7, 1989, Ser. No. 335,056
Claims priority, application Sweden, Apr. 11, 1988, 8801314
Int. Cl.[5] B62D *25/10*; E05F *1/08*
U.S. Cl. 296—76 **9 Claims**



1. A suspension system, comprising:

(A) a body;

(B) a door which is connected to the body at a pivot axis, the door having a closed position, an intermediate position and an open position, the door being pivotable about the pivot axis in an opening angular direction from the closed position to the intermediate position and then to the open position, the door being pivotable about the pivot axis in a closing angular direction, the closing angular direction being opposite to the opening angular direction;

(C) a tension spring with a first end and a second end, the first end being connected to the body, the second end being connected to the door, the tension spring pulling the door in the opening angular direction when the door is in the closed position, the tension spring pulling the door in the opening angular direction when the door is in the intermediate position; and

(D) a pneumatic compression spring with a first end and a second end, the first end of the pneumatic compression spring being connected to the body, the second end of the pneumatic compression spring being connected to the door, the pneumatic compression spring pushing the door in the closing angular direction when the door is in the closed position, the second end of the pneumatic compression spring being located directly between the pivot axis and the first end of the pneumatic compression spring when the door is in the intermediate position, the pneumatic compression spring pushing the door in the opening angular direction when the door is in the open position, the pneumatic compression spring including an end position damper for reducing the speed at which the door approaches the open position.

4,966,404

WINDSHIELD VISOR FOR TRUCKS HAVING CAB ROOF LIGHTS

Allan W. Lund, Minneapolis, Minn., assignor to Lund Industries, Inc., Minneapolis, Minn.

Filed Dec. 16, 1988, Ser. No. 285,629
Int. Cl.[5] B60J *3/00*
U.S. Cl. 296—95.1 **6 Claims**

6. A windshield visor adapted for mounting to a roof of a vehicle's cab having light fixtures, the visor comprising:

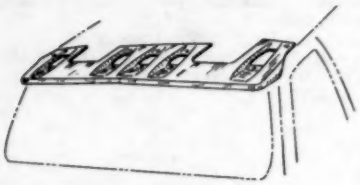
a. a primary shielding surface having a back end extending

over the vehicle's roof and front end extending away from the roof and generally over the vehicle's windshield;

b. venting means defined in said primary shielding surface for venting air through the visor over the vehicle's roof;

c. light housing means defined in said primary shielding surface for receiving the light fixtures through said primary shielding surface and for providing structural support to said primary shielding surface, said light housing means including a surface which conforms to the vehicle's roof, said surface surrounding an aperture defined therein for receiving the light fixture; and

d. attaching means for securing the visor to the roof of the vehicle.



4,966,405

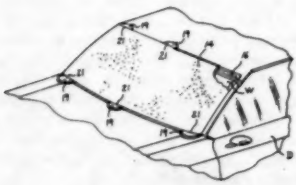
VEHICULAR WINDSHIELD COVER

Shawn A. Tremaine, 7305 Budge Way, Bakersfield, Calif. 93909, and Loren M. De La Rosa, 1905 Marc A. Mitscher, Bakersfield, Calif. 93304

Filed Jun. 5, 1989, Ser. No. 362,007

Int. Cl.[5] B60J *11/00*

U.S. Cl. 296—95.1 **6 Claims**



1. A vehicular windshield cover for overlying securement of a windshield of an associated vehicle, said cover comprising,

a flexible central body portion defined by spaced side edges, and spaced forward and rear edges, the spaced forward and rear edges defining a predetermined length of the central body portion,

and

plural aligned pairs of securement means secured adjacent the forward and rear edges for securement of the central body portion to selective surface portions of said vehicle,

and

an elongate flexible cord secured to the central body portion and of a length greater than the predetermined length of the central body portion,

and

enlarged end members integrally secured to each remote end of the cord for securement of the enlarged end members within said vehicle when the central body portion is overlying the windshield,

and

wherein the central body portion includes a heat reflective surface,

and

wherein the securement means include aligned pairs of securement pads, each pad including a pocket formed about a surface of the pad with a single magnet secured within each pocket,

and

wherein the securement means include plural aligned pairs of elongate hollow legs, each leg filled with magnetic spherical shot for securement of the legs to surface portions of the automobile.

4,966,406

COVER DEVICE FOR MOTOR VEHICLES

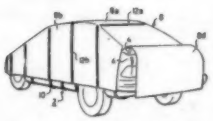
Alexander Karasik, Bat Yam, and David Oron, Hod Hasharon, both of Israel, assignors to Soldon Achzakot (1990) Ltd.

Filed Jun. 15, 1989, Ser. No. 366,386

Claims priority, application Israel, Oct. 7, 1988, 87970

Int. Cl.[5] B60J *11/00*

U.S. Cl. 296—98 **5 Claims**



1. A cover device for covering a motor vehicle having a front end, doors and windows on the opposite sides of the vehicle, a front bumper, a rear end including a trunk and trunk lid, and a rear bumper, comprising: a housing attachable to the vehicle; and a cover of flexible sheet material disposed within said housing and withdrawable therefrom to cover the vehicle; said cover comprising a main section of sufficient length to extend from said housing over the top of the vehicle and its front end and to be attached to the vehicle front bumper, and a pair of side sections secured to opposite sides of the main section to cover the doors and windows on the opposite sides of the vehicle; a first plurality of parallel, elongated, stiffening rods carried by and extending continuously substantially completely across the main section and spaced longitudinally thereof; and a second plurality of parallel, elongated stiffening rods carried by and extending along said side sections of the cover, said second plurality of rods extending continuously substantially from the edge of the respective side section adjacent said main section to the opposite edge of the side section.

4,966,407

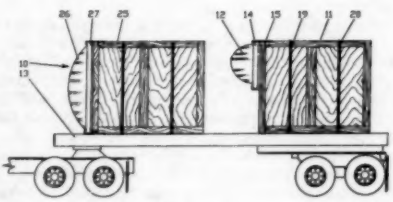
REMOVABLE WIND DEFLECTOR FOR FREIGHT CONTAINER, AND ASSEMBLY

Russell F. Lusk, 1025 N. Parton, Santa Ana, Calif. 92701

Filed Apr. 24, 1989, Ser. No. 341,942

Int. Cl.[5] B62D *35/00*

U.S. Cl. 296—180.1 **8 Claims**



1. A lightweight assembly of a wind deflector for a freight container providing forward and trailing and edges, the deflector being of rigid form integrally formed with a deflector frame depending below a lower edge of said deflector, the frame being secured to the container solely by means of remov-

able bolt means mounted on at least each of two lower corners of the frame, the frame thereby being adapted to be removably mounted on at least a portion of the forward end of the container, the freight container being adapted for loading and securement from a dock side onto an open vehicle, and then mounting of the frame and integrally formed deflector onto the container, or dismounting of the frame and integrally formed deflector from the container.

4,966,408

MOTOR VEHICLE

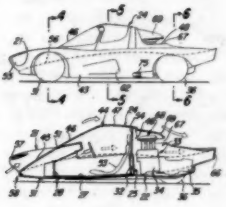
Takuya Yura, Gotemba, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Nov. 27, 1987, Ser. No. 126,047

Claims priority, application Japan, Nov. 28, 1986, 61-282011; Nov. 28, 1986, 61-282012

Int. Cl.[5] B60R *27/00*

U.S. Cl. 296—185 **25 Claims**



1. A motor vehicle body for a vehicle having a pair of front wheels and a pair of rear wheels, said body comprising a pair of fenders each extending generally rearwardly from the front of said vehicle, over one of said front wheels, over the rear wheel at the respective side and terminating at the rear of said vehicle, a central body portion extending from the front to the rear of said vehicle and defining a front portion, a passenger compartment, and engine compartment behind said passenger compartment and a rear end, and joining portions joining central body portion to said fenders, said joining portions being concave in transverse cross-section from the front of the rear of said body to define a pair of continuous front to a rear air flow channels lying below the tops of said fenders, the front of said fenders being substantially higher than the front of said central body portion and further including a bridging section fixed to the front portions of said fenders and extending transversely across said central body portion and above the adjacent part of said central body portion for defining an air inlet opening below said bridging section and above said central body portion.

4,966,409

SHIELD FOR COVERING THE GAP BETWEEN THE SLIDING COVER AND THE ROOF FRAME OF A SLIDING ROOF OR SLIDING LIFTING ROOF OF A MOTOR VEHICLE

Karl Schmidhuber, Alzenau; Rainer Grimm, Wetzlar, and Horst Böhm, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Rockwell-Golde G.m.b.H., Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 380,943

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825838

Int. Cl.[5] B60J *7/05, 7/22;* B60R *13/07*

U.S. Cl. 296—213 **7 Claims**

1. A multipart telescopable shield for covering the lateral gap between the underside of a rigid sliding cover with which it is displaceable and the roof frame of a roof of a motor vehicle, the sliding cover having front and rear guide shoes which are guided on guide rails arranged laterally on the roof frame comprising; a water deflector displaceable with the sliding cover, the water deflector being guided by additional guide shoes on guide rails and being connected by connecting arms constructed as a shield to the front guide shoes;

wherein the connecting arms comprises a lower part having an elongate and upwardly open cavity and at least one

lamellar strip moveably engaging in the cavity, and resilient means being provided between the lower part and said at least one lamellar strip, the resilient means acting to displace the lamellar strip toward the sliding cover.

4,966,410

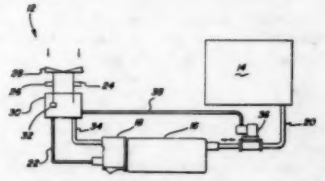
PUMPING SYSTEM FOR THE BACK SUPPORT OF A SEAT

Macram N. Bishai, Windham, N.H., assignor to McCord Winn Textron, Winchester, Mass.

Filed Apr. 17, 1989, Ser. No. 338,576

Int. Cl.[5] A97C *7/46*

U.S. Cl. 297—284 **3 Claims**



1. A high pressure system for power inflating and power bleeding the back support of a seat, and system comprising a predetermined high pressure air cell mounted in said back support, a combination electric motor and reversible pump, a two-position switch with two alternately operative pairs of contacts, a normally closed bleed valve, a first conduit communicating between said air cell and said pump, a second conduit communicating between said pump and said bleed valve, and a pressure cutoff switch operatively mounted in said first conduit, said switch adapted in one position to actuate said motor and pump in one direction to fill said air cell via said first conduit, and in the other position to open said normally closed bleed valve and initially manually bleed said air cell and to reverse said motor and pump to power bleed said air cell once the system pressure becomes lower than the set pressure of said pressure cut-off switch.

4,966,411

CHAIR PROVIDED WITH A BACKREST

Miyoshi Katagiri; Tunetaro Ito; Masamitu Miyashita, all of Nagano; Shinichi Kaneda; Yoichi Suzuki, both of Osaka, and Takao Sugano, Osaka, all of Japan, assignors to Kokuyo Co., Ltd., Osaka and Takano Co., Ltd., Nagano, both of, Japan

PCT No. PCT/JP87/00818, § 371 Date May 17, 1989, § 102(e) Date May 17, 1989, PCT Pub. No. WO89/03649, PCT Pub. Date May 5, 1989

PCT Filed Oct. 24, 1987, Ser. No. 368,348

Int. Cl.[5] A47C *3/026*

U.S. Cl. 297—301 **12 Claims**

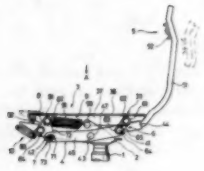
1. A chair which comprises:

a support base;

a seat which is movable forwardly and rearwardly, said seat

comprising a front part and a rear part, wherein the front part is pivotably supported by the support base;

a balancing member positioned below the seat so as to extend longitudinally, said balancing member having a front portion, a rear portion, and a fulcrum set between the front portion and the rear portion so that said front portion is movable upwardly and downwardly, said balancing member being supported by said support base at the fulcrum;



a backrest provided on the rear portion of the balancing member;

seat receiving means for pivotally connecting the rear part of said seat to the rear portion of said balancing member; and

motion translating means for operably connecting the front portion of said balancing member to the front part of said seat, said motion translating means translating an upward movement of said front portion of said balancing member to a forward movement of said seat.

4,966,412

CHAIR, IN PARTICULAR OFFICE CHAIR

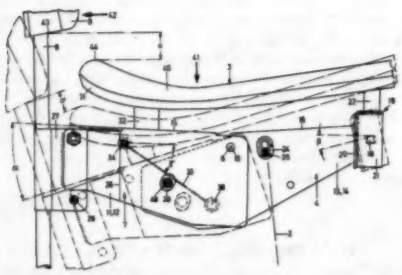
Elke Dauphin, Offenhausen bei Nürnberg, Fed. Rep. of Germany, assignor to Burositzmobelfabrik Friedrich-W. Dauphin GmbH & Co., Offenhausen, Fed. Rep. of Germany

Filed Jun. 4, 1985, Ser. No. 741,247

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3438843; European Pat. Off., Mar. 14, 1985, 85102947.0

Int. Cl.[5] A47C *1/032*

U.S. Cl. 297—301 **12 Claims**



1. A chair, in particular an office chair, having a base and a seat disposed thereon as well as a backrest, wherein the seat and the backrest are supported such that they are pivotable in a coordinated manner about horizontal axes in accordance with the shift in weight of a user, and wherein at least one gas spring is provided for damping the pivoting movement and for attaining a restoring action, said chair comprising:

a seat carrier (4), and a backrest support part (7) for securing a backrest supporting column (9) which is joined to the seat carrier such that it is pivotable about a first axis (6);

a supporting column (2), supported on the base (1), and being rigidly fixable on, but removable from, the seat carrier (4), said seat carrier (4) extending parallel to the seat and comprising an inner rear end and an outer front end;

a seat holder (19) projecting upwardly beyond the seat carrier (4) and being pivotable thereon about a pivot axis (18) provided on the seat carrier (4);

the seat (3), in the vicinity of a front section thereof, being rigidly joined to the seat holder (19);

the seat (3), in the vicinity of a section located behind the first axis (6), being elastically joined to the backrest support part by elastic buffers (32);

said gas spring (33) being disposed between the backrest support part (7) and the seat carrier (4), said gas spring extending obliquely with respect to the seat (3), and having one end supported on a first articulation shaft (36) and the opposite end supported on a second articulation shaft (34);

the first articulation shaft (36) for the gas spring (33) being disposed on the seat carrier (4) below the first axis (6) between the backrest support part (7) and the seat carrier (4) spaced apart from a corner of the seat,

the second articulation shaft (34) of the gas spring (33) being disposed on the backrest support part (7) in the vicinity of the upper edge and the rear edge thereof; and

the distance between the pivot axis (18) of the seat holder (19) and the pivot axis (6) between the seat carrier (4) and backrest support part(7) being at a ratio of approximately 2:1 to the distance between he pivot axis (6) and the articulation axis (36) of the gas spring (33) on the seat carrier (4).

4,966,413

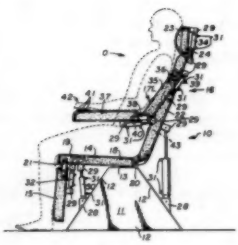
ARTICULATED RELAXATION CHAIR

Timothy D. Palarski, 2379 Briarwest, No. 138, Houston, Tex. 77077

Filed Aug. 17, 1989, Ser. No. 394,874

Int. Cl.[5] A47C *1/02*

U.S. Cl. 297—330 **20 Claims**



1. An articulated relaxation chair comprising;

a floor engaging base,

leg rest means pivotally secured to said base for vertical pivotal movement relative thereto including a seatthigh support member having a seat support portion at its rearward end for supporting the buttocks of the chair occupant and a thigh support portion extending forwardly therefrom for supporting the thighs of the occupant, and

a calf support member pivotally secured at its rearward end to the forward end of said thigh portion for vertical pivotal movement relative thereto,

operating means secured between said leg rest means and said base for pivotally moving said leg rest means relative to said base,

operating means secured between said calf support member and said seat-thigh support member for pivotally moving said calf support portion relative to said thigh support portion,

back rest means pivotally secured to said base at the rearward end of said leg rest means for vertical pivotal movement relative thereto,

operating means secured between said back rest means and said base for pivotally moving said back rest means relative to said leg rest means and said base,

each said operating means secured to a source of power for operating same, and

selective control means operatively connected with said operating means for selectively controlling the movement of each said operating means independently to provide the occupant with selective positioning of said calf support portion, said thigh support portion, and said back rest means relative to one another and to said base.

4,966,414

LAWN FURNITURE AND METHOD OF MAKING SAME

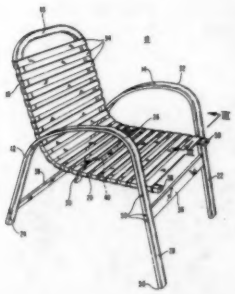
Larry A. Schwartz, Scarsdale, N.Y., and Bertram Lesser, Hackensack, N.J., assignors to Omni Products International, Inc., Fairfield, N.J.

Continuation of Ser. No. 229,906, Aug. 8, 1988, which is a continuation of Ser. No. 26,859, Mar. 17, 1987, Pat. No. 4,762,368, which is a continuation of Ser. No. 695,263, Jan. 28, 1985, Pat. No. 4,674,799. This application Aug. 8, 1989, Ser. No. 391,433

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.[5] **A47C** *5/00*

U.S. Cl. 297—445 **26 Claims**



1. A light weight chair or chaise lounge having improved strength comprising first and second hollow outer members each having at least one inner member separating the interior of said outer members into at least two longitudinally-extending chambers at least partially enclosed from each other by said inner member; a metal member longitudinally-extending within at least one chamber of each of said outer members to provide strength to said outer members; seat means for forming a body supporting portion of said chair or chaise lounge, said seat means attached between said first and second hollow outer members; and attaching means for attaching said seat means between said first and second hollow outer members, said attaching means having a first and second end portion, said first end portion received interiorly of said first and second hollow outer members proximate said inner member and said second end portion extending exteriorly of said first and second hollow outer members and secured to said seat means.

4,966,415

STRUCTURAL MEMBER AND LAWN FURNITURE CONSTRUCTED THEREFROM

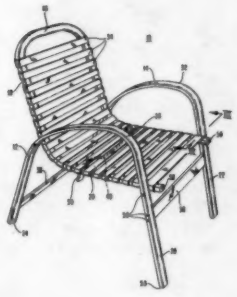
Larry A. Schwartz, Scarsdale, N.Y., and Bertram Lesser, Hackensack, N.J., assignors to Omni Products International, Inc., Fairfield, N.J.

Continuation of Ser. No. 26,859, Mar. 17, 1987, Pat. No. 4,762,368, which is a continuation of Ser. No. 695,263, Jan. 28, 1985, Pat. No. 4,674,799. This application Aug. 8, 1988, Ser. No. 229,906

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.[5] **A47C** *5/00*

U.S. Cl. 297—445 **4 Claims**



1. A light-weight chair or chaise lounge having improved strength comprising:

first and second hollow rigid plastic outer members having a longitudinal length each having at least one longitudinally-extending member formed therein, said at least one longitudinally-extending member dividing the hollow interior of said first and second hollow rigid plastic outer members into at least two longitudinally-extending chambers that extend along substantially the entire length of the rigid plastic outer members and at least partially enclosed from each other by said at least one longitudinally-extending member;

a longitudinally-extending metal member located within at least one of said longitudinally-extending chambers of each of said first and second hollow rigid plastic outer members to provide strength thereto, said metal member restrained by at least said longitudinally-extending member and by portions of said first and second hollow rigid plastic outer members into which said metal member is inserted by substantially filling said chamber in order to maintain both the lateral and transverse position of said metal member within said chamber, said first and second hollow rigid plastic outer members in cooperation with their respective said metal member forming load bearing members configured into at least a weight bearing portion of said chair or chaise lounge; and

seat means for forming a body supporting portion of said chair, said seat means carried by and attached between said first and second hollow rigid plastic outer members.

4,966,416

FRAGMENTATION OF AN UNDERGROUND ORE BODY

Gwyn Harries, Elsternwick, Australia, assignor to ICI Australia Limited, Victoria, Australia

Continuation of Ser. No. 397,345, Jul. 12, 1982, abandoned. This application Jan. 17, 1986, Ser. No. 801,969

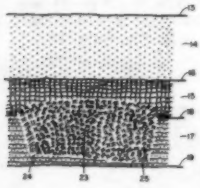
Claims priority, application Australia, Jul. 21, 1981, PE 9823

Int. Cl.[5] **E21B** *43/00, 43/263*

U.S. Cl. 299—13 **11 Claims**

1. A process for converting subterraneous ore into a mass of

fragmented ore which process consists of the steps of placing explosives within a rock formation consisting of a ground surface, an overburden layer, a porous rock layer having a porosity of at least 10%, an interface in contact with the lower surface of the overburden and the upper surface of the porous rock formation, an ore body below said porous rock formation, and an interface in contact with the upper surface of said ore



body and the lower surface of said porous rock formation, detonating explosive charges within said porous rock layer to fragment and compress the porous rock without elevating the surface above the formation and to create a void space adjacent the ore body, and then detonating explosives within the ore body to fragment said ore body and distribute it within said void space.

4,966,417

DEVICE FOR GUYING A DRIFT ADVANCING MACHINE WITHIN A DRIFT

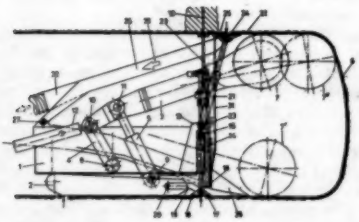
Alfred Zitz, Zeltweg; Franz Bärnthaler, Weiskirchen, and Erich Brandl, Grosslobming, all of Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Aug. 22, 1989, Ser. No. 396,897

Claims priority, application Austria, Aug. 23, 1988, 2080/88

Int. Cl.[5] E21C 35/22; E21D 23/00

U.S. Cl. 299—33 **7 Claims**



1. Device for guying a drift advancing machine within a drift, comprising props which can be guyed between the drift roof and the drift floor and having connected thereto articulated caps, characterized in that at both sides of the longitudinal center plane of the machine there is arranged at least one hydraulic cylinder-piston-aggregate each between a supporting block fixed on the machine frame and the drift floor as well as between the supporting block and the drift roof in a guyable manner, wherein the cylinder-piston-aggregates are articulately connected to floor supporting plates adapted to be pressed against the drift floor and to roof caps and are articulately connected to the supporting block and comprising thrust supports for connecting the floor supporting plates and the roof caps with the machine frame, wherein the thrust support connecting the articulated connections of the roof cap on the cylinder-piston-aggregates with the machine frame is swivelably linked in proximity of the rear end of the machine.

4,966,418

FRONT-LOADING CUTTING DEVICE FOR CUTTING UP DAMAGED ROAD SURFACES

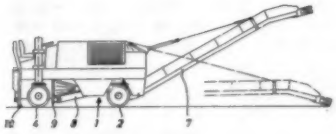
Reinhard Wirtgen, Hohner Strasse 2, D-5469 Windhagen, Fed. Rep. of Germany

Filed Jan. 26, 1990, Ser. No. 470,879

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1989, 3903482

Int. Cl.[5] E01C 23/12

U.S. Cl. 299—39 **5 Claims**



1. Front-loading cutting device for cutting up damaged road surfaces, having a self-driving chassis with a pair of front wheels and a pair of rear wheels, and having a cutting cylinder which is height-adjustable in relation to the chassis, and having a loading belt arranged at the front end, characterized in that the cutting cylinder (6) is arranged at the rear of the chassis (1) and a transport belt (8) is provided for the cut-up material below the chassis (1) between the cutting cylinder (6) and the loading belt (7).

4,966,419

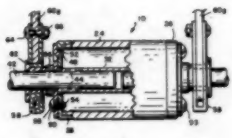
KNOCK-DOWN WHEEL ASSEMBLY

Joel C. Cunard, Bedford, Pa., assignor to Hedstrom Corporation, Bedford, Pa.

Filed Jun. 2, 1988, Ser. No. 201,456

Int. Cl.[5] B60B 27/00, 37/00

U.S. Cl. 301—2.5 **11 Claims**



1. A wheel assembly comprising:

A. a wheel including a hub composed of a tube, and first and second end caps secured to opposing ends of the tube, the end caps having axially aligned openings;

B. a center shaft for receiving in said openings and bridging the end caps;

C. first and second crank-shaped outer shafts, said outer shafts having corresponding first end segments for extending toward one another through the respective cap openings coaxially with said center shaft;

D. interfitting means on said center and said outer shafts for rotatively locking said first end segments to the opposite ends of said center shaft;

E. flanges on said outer shafts adjacent to said first end segments thereof, said flanges being disposed opposite the respective end caps when the outer shafts are rotatively locked to the center shaft; and

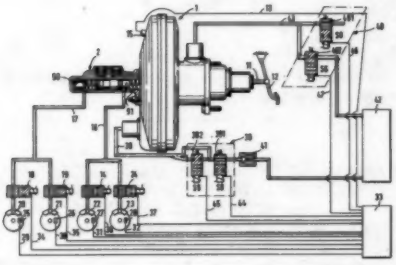
F. means for securing the flanges to the respective end caps.

4,966,420

AUTOMOTIVE VEHICLE BRAKING UNIT

Lothar Schiel, Hofheim; Ralf Jakobi, Liederbach, and Juergen Bauer, Wiesbaden, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,978
Claims priority, application Fed. Rep. of Germany, May 26, 1988, 3817785
Int. Cl.[5] B60T *8/32*
U.S. Cl. 303—114 16 Claims



1. An automotive vehicle braking unit with a vacuum brake power booster being arranged between the brake pedal and the master brake cylinder and furnished with at least two power chambers being divided from each other by a movable wall, the first one of said power chambers being connectible to a vacuum source and the second one being ventable through a control valve actuatable by means of a piston rod coupled with the brake pedal in order to generate a boosting power which is proportional to the brake pedal effort, wheel brake cylinders being connected through brake lines to a primary and a secondary pressure chamber of the master brake cylinder, with sensors associated with the wheels to be braked and detecting the rotating behavior of the wheels in order to determine any locking and whose output signals are transmittable to a central electronic control system by whose control signals hydraulic fluid inlet and outlet valves are controllable which are electromagnetically actuatable and are inserted in the brake lines for the purpose of slip control, wherein pneumatic means (39, 40) are provided which provide venting of the said first power chamber (5) and evacuation of said second power chamber (6) in the event of a slip control action in order to control the boosting power of the said vacuum brake power booster (1) in a direction opposed to the direction of actuation of said master brake cylinder (2) and means including a plurality of electromagnetic valves for respectively connecting the first and second power chambers alternately to one of said vacuum source and the atmosphere.

4,966,421

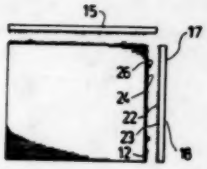
METHOD OF AND STRUCTURE FOR THE JOINING OF SUBSTANTIALLY RIGID PARTS TOGETHER

Craig Mengel, 2114 Robinson Street, Regina, Saskatchewan, S4T 2P7, Canada

Continuation of Ser. No. 221,120, Jul. 19, 1988, Pat. No. 4,883,331. This application Oct. 10, 1989, Ser. No. 420,152
Claims priority, application Canada, Jul. 24, 1987, 542982
The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.
Int. Cl.[5] A47B *17/00*
U.S. Cl. 312—195 5 Claims

1. In an article of knock down furniture comprising a plurality of panels joined face to face by hook and loop fastener material with two detachably engageable portions secured to opposed faces of adjacent panels, mechanical alignment means for aligning the panels in a predetermined alignment, said mechanical alignment means comprising:

dowel means secured to and projecting from one of the opposed faces of adjacent panels and engageable with the other of the opposed faces for preventing engagement of



the fastener material portions, and aperture means in the other of the opposed faces for receiving the dowel means when the panels are in the predetermined alignment, whereby the portions of the fastener material are allowed to come into engagement only int eh predetermined alignment.

4,966,422

DESK AND FILE DRAWER LOCK

Russell E. Albright, 28852 Modjeska Canyon Rd., Orange, Calif. 92667, and Kenneth G. Green, 304 Sweeturter St., Anaheim, Calif. 92807

Filed Oct. 24, 1988, Ser. No. 261,491
Int. Cl.[5] E05B *53/00*
U.S. Cl. 312—218 9 Claims

1. A reversible latch mechanism comprising:

a. a single-piece housing formed as a rectangular block having end walls and longitudinal side walls and having a spring retaining cavity formed centrally on one of the longitudinal side walls, said one longitudinal side wall including a pair of raised lip portions on opposite longitudinal edges thereof, and a pair of flanges extending outwardly from the opposite raised lipped portions, each flange having at least one aperture for receiving a mounting fastener;

b. a flat plate latch member slidably received between said raised lip portions and having an elongated aperture with a size coextensive the width and length of said cavity and aligned therewith;

c. a compression spring received in said spring retaining cavity and extending radially into said elongated aperture of said latch member, whereby said latch member is resiliently biased into alignment with said spring cavity; and

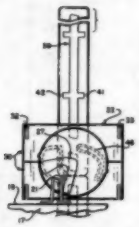
d. an inclined ramp guide on at least one end of said latch member.

4,966,423

CABINET DRAWER INTERLOCKING APPARATUS

Bernard A. Higuera, Alhambra, and Miguel A. Arreola, Ontario, both of Calif., assignors to Russ Bassett Company, Whittier, Calif.

Filed Dec. 21, 1989, Ser. No. 454,761
Int. Cl.[5] E05C *7/06*
U.S. Cl. 312—221 **10 Claims**



1. Cabinet drawer interlock apparatus for preventing opening of further drawers after any one cabinet drawer has been open, comprising:

separate actuator means affixed to each drawer outer surface;

a plurality of locking bars, one for each drawer, arranged in end-to-end contacting relation, said locking bars being mounted to a cabinet inside surface and capable of individual relative movement, each said locking bar including,

a unitary rod extending along a surface facing the adjacent drawer and terminating short of each locking bar end, said rod having a slot therein; and separate locking means for each drawer

mounted on each locking bar including

a rotor having a V-shaped sprocket on one surface and first and second pawl means on another surface, said V-shaped sprocket engaged with the actuator when the said drawer is closed into the cabinet, and said first pawl means being lockingly positioned between the opposed ends of rods on adjacent locking bars and said second pawl means being positioned within the rod slot when the said drawer is open which moves the remaining locking bars an amount sufficient to misalign the remaining rotor pawls with the respective opposed ends of rods on adjacent locking bars and slots in said rods.

4,966,424

CABINET CONSTRUCTION

Walter Schneider, Langnau, Switzerland, assignor to W. Schneider & Co., AG Metallwarenfabrik, Langnau, Switzerland

Filed Apr. 28, 1989, Ser. No. 345,351
Claims priority, application Switzerland, May 5, 1988, 1706/88
Int. Cl.[5] A47B *47/00*
U.S. Cl. 312—265.6 **16 Claims**

1. Cabinet construction, particularly bathroom cabinet, comprising the combination of

a base body (7) of plastic material having side walls subject to damage,

cover sheets (4) of a material capable of protecting the side walls (2) and covering the side walls, and means (6, 20) for connecting the cover sheets to the base body (7),

wherein the connecting means includes

shaped corner connecting rails (6) formed with integral lateral oppositely located slide portions which are positioned with respect to each other at an angle corresponding to an angle between adjacent side walls and engaging against the cover sheets (4),

said rails comprising elastic material,

front and back end pieces (10, 11) terminating said rails, and projection-and-recess means (12, 13; 8, 9) formed on the end pieces (10, 11) and on the base body (7), respectively, to permit engagement of the rails (6) on the base body (7)

after assembly of the cover sheets (4) over the side walls (2) of the base body (7).

4,966,425

REFLECTING SCREEN, ITS MANUFACTURING METHOD AND ITS APPLICATION TO HEAT-INSULATION DEVICE

Jean Henri L. Dieul, Voisin le Bretonneaux, France, assignor to Bronzavia Air Equipment, Courbevoie, France

Continuation of Ser. No. 1,190, Jan. 7, 1987, abandoned. This application Sep. 20, 1989, Ser. No. 410,006
Claims priority, application France, Jan. 10, 1986, 86 00320
Int. Cl.[5] G02B *5/28*
U.S. Cl. 350—1.7 **15 Claims**

1. Screen to reflect radiation, especially infrared radiation, designed to be used at a determined temperature of at least 900° C. comprising:

a support layer of an opaque refractory material;

at least, a first layer of a reflecting material deposited on the support layer which reflects infrared radiation over a first specific frequency range;

a second layer covering said first layer, said second layer being made of a bright and polished material different from the material used in the first layer, which does not deteriorate when it is brought to the said temperature and reflects at least a part of the infrared radiation over a second specific frequency range different from the first specific frequency range but in part superposed to said first specific frequency range;

the first layer blocking the radiation not reflected by the second layer;

4,966,426

REVERSE LIGHT BLOCKING HOLOGRAM FOR A CENTER HIGH MOUNTED STOPLIGHT

Gaylord E. Moss, Marina de Rey; John E. Wreede, Monrovia, and Kevin Yu, Temple City, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

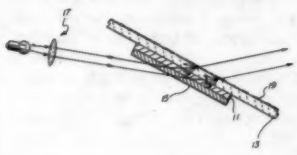
Filed Sep. 29, 1989, Ser. No. 414,969
Int. Cl.[5] G02B *5/32*
U.S. Cl. 350—3.7 **15 Claims**

11. A rear stoplight assembly for a vehicle having a rear window, comprising:

holographic stoplight imaging means secured to the rear window for producing stoplight illumination in response to playback illumination;

means for providing playback illumination for said holographic imaging means; and

holographic scatter blocking means for transmitting said playback illumination to said holographic imaging means,



and for preventing scattered stoplight illumination from being viewable by the vehicle operator, said holographic scatter blocking means being substantially transparent to the rearward vision of the operator of the vehicle.

4,966,427

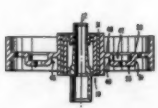
FLEXIBLE SCANWHEEL

Merle D. Parker, Oceanside, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 21, 1989, Ser. No. 383,829

Int. Cl.[5] G02B *26/08*

U.S. Cl. 350—6.8 **10 Claims**



1. A scanwheel comprising:

(a) a facet ring having a plurality of facets arranged about a common axis of revolution;

(b) a hub within said ring and concentric therewith;

(c) a web connecting said hub and said ring, said web having a circumferential jog section intermediate said hub and said ring; and

(d) said jog section comprising an axially extending wall having a plurality of symmetrically distributed strain relief slots therein.

4,966,428

MANUFACTURE OF INTEGRATED CIRCUITS USING HOLOGRAPHIC TECHNIQUES

Nicholas J. Phillips, Loughborough, England, assignor to Holtronic Technologies Limited, London, Great Britain

Filed Feb. 3, 1989, Ser. No. 306,638

Claims priority, application United Kingdom, Feb. 3, 1988, 8802333

Int. Cl.[5] G03H *1/20*

U.S. Cl. 350—3.66 **10 Claims**

1. Apparatus for the manufacture of integrated circuits using holographic techniques including:

(a) a glass slab;

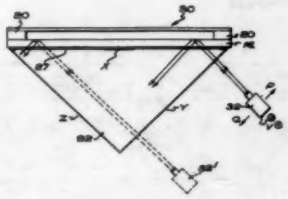
(b) a first recording medium provided on a first surface of the glass slab on which a hologram of an integrated circuit has been recorded;

(c) a prism one face of which is juxtapositioned at a second surface of the glass slab;

(d) an index matching liquid located between the glass slab and the prism;

(e) means for generating a narrow replay beam of collimated light which passes through the prism and which is totally internally reflected at the first surface of the glass slab;

(f) a second recording medium provided on a silicon wafer, the replay operation effecting the printing of an image of an integrated circuit on the second recording medium by regeneration from the hologram; and



(g) means for moving the narrow replay beam generating means so that the collimated light smoothly in a zig-zag manner in lines of alternate direction from one corner of the surface of the glass slab to a diametrically opposite corner, whereby the whole hologram is scanned and the image of the integrated circuit recorded on the second recording medium of the silicon wafer.

4,966,429

OPTICAL SCALE READING APPARATUS

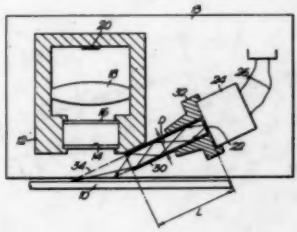
William F. N. Stephens, Badminton, and Shane W. Thornton, Cambridge, both of United Kingdom, assignors to Renishaw plc, Gloucestershire, United Kingdom

Filed Aug. 29, 1989, Ser. No. 399,238

Claims priority, application United Kingdom, Sep. 2, 1988, 8820776.6

Int. Cl.[5] G02B *27/02*

U.S. Cl. 350—96.10 **8 Claims**



1. Optical scale reading apparatus for use with a scale, comprising a light source for illuminating the scale; an optical fibre arranged to receive light emitted from the light source and forming an optical path directing the light towards a selected area of the scale; and a readhead positionable to receive light reflected from said area of the scale and which provides output signals indicative of relative movement between said scale and said readhead, wherein said optical fibre includes means for homogenising light received from the light source so that any non-uniformity in light emitted from the light source is reduced before the light illuminates the scale.

4,966,430

SEMICONDUCTOR CIRCUIT

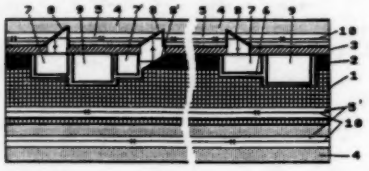
Edgar Weidel, Sendea, Fed. Rep. of Germany, assignor to Telefunken Systemtechnik GmbH, Ulm, Fed. Rep. of Germany

Filed Oct. 10, 1989, Ser. No. 419,583

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834335

Int. Cl.[5] G02B 6/12

U.S. Cl. 350—96.11 15 Claims



1. In a semiconductor circuit arrangement including a substrate having at least one integrated circuit disposed at a major surface of the substrate and a plurality of electrical conductor paths disposed on said major surface for providing electrical connections to said at least one integrated circuit; the improvement comprising: a recess in said major surface of said substrate; said at least one integrated circuit and one of an electro-optical and an opto-electrical transducer disposed in said recess and each extending to said major surface and with said transducer being electrically connected with said at least one integrated circuit via at least one of said conductor paths; an optical connecting layer containing at least one light waveguide disposed on said main surface of said substrate above said plurality of conductor paths; and means for optically coupling said transducer to said at least one light waveguide.

4,966,431

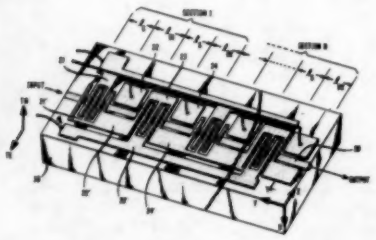
INTEGRATED-OPTIC ENDLESS POLARIZATION TRANSFORMER

Fred L. Heismann, Freehold, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 10, 1989, Ser. No. 392,819

Int. Cl.[5] G02B 6/14

U.S. Cl. 350—96.14 20 Claims



4. A polarization transformer for controlling polarization and phase of optical signals propagating in a birefringent waveguide at a desired wavelength of operation, said polarization transformer comprising N sections, for N being an integer greater than 1, each section including in cascade:

a first mode converter for changing amplitudes of orthogonally polarized components of the optical signals relative to each other;

a first phase shifter for changing phases of said orthogonally polarized components of the optical signals relative to each other;

a second mode converter for changing amplitudes of orthogonally polarized components of the optical signals relative to each other;

a second phase shifter for changing phases of said orthogonally polarized components of the optical signals relative to each other;

each said section having a length $M\cdot\lambda$ and said second mode converter being located substantially at a distance $(2m-1)\lambda/4$ from the beginning of said first mode converter, wherein m and M are positive integers and $1 \leqq m \leqq 2M$ and λ is a beat length of said orthogonally polarized components of the optical signals in said waveguide at the desired wavelength of operation.

4,966,432

OPTICAL COUPLER AND PROCESS FOR PREPARATION THEREOF

Hiroshi Okada; Masatoshi Toda, both of Tokyo; Shingo Suzuki, Zama; Manabu Kagami, Kawasaki, and Masayoshi Komiya, Tokyo, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

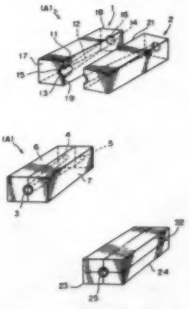
Division of Ser. No. 181,578, Apr. 14, 1988, Pat. No. 4,911,514.

This application Oct. 24, 1989, Ser. No. 425,880

Claims priority, application Japan, Apr. 20, 1987, 62-58731

Int. Cl.[5] G02B 6/26

U.S. Cl. 350—96.15 2 Claims



1. A process for the preparation of an optical coupler, which comprises arranging a light branching-coupling optical fiber defining an axis in an optical fiber-inserting hole of a block having an abutting plane, the abutting plane of the block having an angle θ of $360°/N$ (where N stands for an integer of not less than 2) to the fiber axis, so that a distal end of the optical fiber projects slightly from the optical fiber-inserting hole at said abutting plane, heat-treating the projecting portion of the optical fiber by a heating apparatus having a heating plate engageable with the abutting plane of the block to cause a plastic deformation of the projecting portion of the optical fiber inserted in the block thereby forming a light-coupling plane at the distal end of the optical fiber coincident with the abutting plane of the block, thus fixing the optical fiber in the block to construct a light branching-coupling part.

4,966,433

DEVICE INCLUDING A COMPONENT IN ALIGNMENT WITH A SUBSTRATE-SUPPORTED WAVEGUIDE

Greg E. Blonder, Summit, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 163,686, Mar. 3, 1988, abandoned. This application Aug. 23, 1989, Ser. No. 399,431

Int. Cl.[5] G02B 6/30

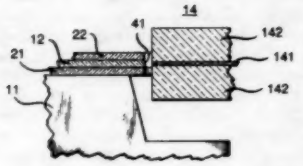
U.S. Cl. 350—96.17 12 Claims

1. A device comprising a thin-film optical waveguide permanently deposited on and supported by an essentially single-

crystal substrate, and an optical fiber axially aligned with said waveguide,

alignment being as resulting upon placement of said optical fiber in a preferentially etched groove in said substrate,

characterized in that said groove undercuts said waveguide



for a distance which is sufficient to permit optical butt coupling between said waveguide and said fiber, butt coupling being defined as resulting either in physical contact between said waveguide and said fiber or in a distance between said waveguide and said fiber which is less than a mode diameter of said fiber.

4,966,434

OPTICAL FIBER CABLE

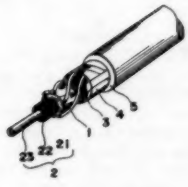
Shinichi Yonechi, Yokohama; Yukinori Ishida, and Masaaki Kawase, both of Ibaraki, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Nippon Telegraph and Telephone Public Corporation, Tokyo, both of, Japan

Filed Aug. 21, 1984, Ser. No. 642,820

Claims priority, application Japan, Aug. 23, 1983, 58-154263

Int. Cl.[5] G02B *6/44*

U.S. Cl. 350—96.23 **6 Claims**



1. An optical fiber cable comprising:

a core which includes a plurality of filaments which are stranded at a first definite pitch;

at least one optical fiber stranded around the core at a second definite pitch which is a shorter pitch than the first definite pitch; and

a jacket surrounding the optical fiber.

4,966,435

PLASTIC OPTICAL FIBER

Tsuruyoshi Matsumoto; Takashi Yamamoto; Teruhiko Sugimori, and Katsuhiko Shimada, all of Ohtake, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

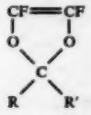
Filed Nov. 29, 1989, Ser. No. 442,714

Claims priority, application Japan, Nov. 29, 1988, 63-299671

Int. Cl.[5] G02B *6/00*; C07D *317/00*; C08F *16/24*

U.S. Cl. 350—96.34 **3 Claims**

1. A plastic optical fiber having a core-sheath structure, wherein the core component is composed of a copolymer of a perfluorodioxole represented by the following formula:



[I]

wherein R and R' independently represent F or CF_3, with at least one other ethylenically unsaturated monomer substantially free of CH bonds, and said copolymer has no first order transition temperature as determined by the differential scanning colorimetry (DSC}and has a second order transition temperature not lower than 100° C. as determined by DSC.

4,966,436

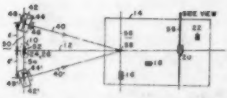
APPARATUS FOR OBTAINING IMAGES FOR USE IN DISPLAYING A THREE-DIMENSIONAL

Christopher A. Mayhew, 6547 Tucker Ave., McLean, Va. 22101, and Eric K. Pritchard, Bowie, Md., assignors to Christopher A. Mayhew, McLean, Va.

Division of Ser. No. 44,259, Apr. 30, 1987, Pat. No. 4,815,819. This application Feb. 13, 1989, Ser. No. 309,573

Int. Cl.[5] G02B *27/22*; G03B *35/00*

U.S. Cl. 350—143 **18 Claims**



1. A support apparatus for an imaging device used to obtain images for displaying a three-dimensional illusion of a subject volume having foreground and background portions as viewed from a first point along an optical axis line extending from said first point and directed toward said volume by an observer having binocular vision originating at left and right points of origin centered around said first point, said imaging device having an optical axis and an effective point of origin from which images may be obtained in the direction of said optical axis, said support apparatus comprising:

a bracket for holding said imaging device; and positioning means

(i) for locating said bracket in a first position wherein said effective point of origin of said imaging device is located in a first plane which includes said first point and which is normal to said optical axis line whereby said first plane includes said left and right points of origin, and wherein said effective point of origin of said imaging device is located a selected distance above a first line connecting said left and right points of origin and said effective point of origin of said imaging device is located along a second line lying in said first plane, which second line is normal to and bisects said first line and intersects said optical axis line,

(ii) for locating said bracket in a second position wherein said effective point of origin of said imaging device is located in said first plane and wherein said effective point of origin of said imaging device is located along said second line said selected distance below said first line, and

(iii) for rotating said bracket about a third line which is parallel to said first line and which passes through said optical axis of said imaging device to align said optical axis of said imaging device while said bracket is in said first position with the optical axis of said imaging device while said bracket is in said second position to converge with each other and with said optical axis line at a convergence point in a second plane parallel to said first

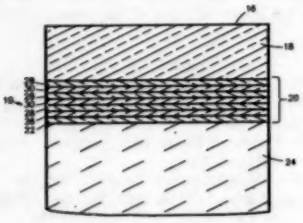
plane, which second plane includes the foreground portion of said subject volume within the field of view of said imaging device which is closest to said first plane.

4,966,437

FAULT-TOLERANT ANTI-REFLECTIVE COATINGS

John P. Rahn, Canoga Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Apr. 19, 1988, Ser. No. 183,569
Int. Cl.[5] G02B 1/10
U.S. Cl. 350—166 6 Claims



1. A method for making an anti-reflective dielectric multifilm, having an outer film of a first material with a known index of refraction and successive layers of second and said first materials, said second material having a known index of refraction higher than the index of refraction of said first material, on a substrate of known index of refraction comprising:

determining the desired predetermined effective index of refraction for the multifilm, said effective index having an increased tolerance to its thickness errors and being correctable for those thickness errors by reducing the thickness of its outer layer and

creating a dielectric multifilm of more than two films having the correct ratio of thicknesses of its sub-layers to obtain the above-mentioned effective index of refraction on an optical substrate, with the outermost film, of said first material, having a thickness greater than its required thickness; and

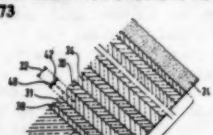
reducing the thickness of said outermost film of said created multifilm to compensate for total thickness error of both itself and said created multifilm to reduce the reflectivity of the multifilm.

4,966,438

DIELECTRIC LAYER POLARIZER

Jacques Mouchart, L'Hay les Roses; Jacqueline Begel, Montlhery, and Eugène Duda, Villebon sur Yvette, all of France, assignors to Societe Anonyme dite: Alcatel Cit, Paris, France

Filed Apr. 4, 1989, Ser. No. 333,151
Claims priority, application France, Apr. 8, 1988, 88 04671
Int. Cl.[5] G02B 27/10, 5/28, 1/10, 27/28
U.S. Cl. 350—173 6 Claims



2. A dielectric layer polarizer for polarizing light having a wavelength, said polarizer comprising:

inlet means for forming or transmitting an incident beam which is constituted by said light and whose rays propagate along directions close to a predetermined direction of incidence;

a transparent substrate having a face on the path of said incident beam, said face being oblique relative to said direction of incidence; and

a polarizing stack formed on said oblique face and constituted by thin dielectric layers, said layers being first and second refractive index polarizing layers presenting a first refractive index and a second refractive index for said light and following one another in alternation starting from said oblique face and having different thicknesses, with the succession of said layers being in the form of a periodic succession of base sequences, each of which is constituted by a plurality of thin dielectric layers alternating between said first and second refractive indices, said sequences being identical to each other with respect to their refractive indices and the thicknesses of the layers which constitute them;

said direction of incidence forming an angle of incidence with the direction perpendicular to said oblique face and to said polarizing layers, said angle of incidence being situated in a plane of incidence and having a value relative to said wavelength and to said refractive indices and thicknesses of the polarizing layers such that said polarizing stack separates said incident beam into a transmitted beam and a reflected beam with crossed polarizations;

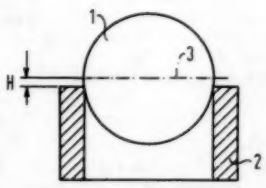
wherein said base sequence is a symmetrical sequence constituted by one of said second index polarizing layers having a second index optical thickness, and two mutually identical half-thickness first index layers situated on either side of said second index layer and each of them having a first index optical thickness which is half said second optical thickness, such that pairs of said half-thickness first index layers combine at each interface between two consecutive base sequences in order to form one of said first index polarizing layers which is of full thickness.

4,966,439

MOUNTING FOR A SUBSTANTIALLY SPHERICAL LENS IN A METAL TUBULE, AND METHOD FOR MAKING SUCH A MOUNTING

Hans-Ludwig Althaus, Lappersdorf, and Andreas Greil, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 330,337
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811032
Int. Cl.[5] G02B 7/02
U.S. Cl. 350—253 6 Claims



1. An optical coupling apparatus, comprising:

a glass lens having a substantially spherical outer surface, a preselected outer diameter, and a predetermined coefficient of thermal expansion; and

a thin-walled metal tubule having an opening in a front face of the tubule, the opening having an inner diameter which is slightly smaller than the outer diameter of the lens, the tubule comprising a material having a coefficient of ther-

mal expansion which is greater than the coefficient of thermal expansion of the lens;

the lens being fastened to the opening in the front face of the metal tubule by means of a press-fit such that a great circle around the outer surface of the lens is a predetermined distance above the front face of the tubule.

4,966,440

POST-EXPOSURE DYE TREATMENT IN THE PRODUCTION OF HOLOGRAMS

David W. Butcher, Goostrey, and Stephen R. Post, Sale, both of England, assignors to Ilford Limited, Cheshire, United Kingdom

Filed Mar. 22, 1989, Ser. No. 327,114

Claims priority, application United Kingdom, Mar. 24, 1988, 8807027.1

Int. Cl.[5] G03H *1/22, 1/04*

U.S. Cl. 350—320 **2 Claims**

1. A process for the production of a hologram which comprises holographically exposing holographic material which comprises a light transparent base having coated thereon light-sensitive silver halide in a hydrophilic water swellable layer in which a holographic image can be formed, processing this layer to form a holographic image which process is characteriaed in that the material is treated during developing with an aqueous bath which comprises a water-soluble dye whose peak absorption is below the peak replay wavelength of the hologram.

4,966,441

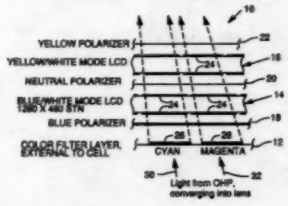
HYBRID COLOR DISPLAY SYSTEM

Arlie R. Conner, Portland, Oreg., assignor to In Focus Systems, Inc., Tualatin, Oreg.

Continuation-in-part of Ser. No. 329,938, Mar. 28, 1989. This application Jun. 7, 1989, Ser. No. 363,099

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—335 **15 Claims**



1. A color display system comprising a color mosaic filter stacked with first and second color liquid crystal display panels, wherein the first liquid crystal display panel defines a uniform array of pixels of a first size, and the second liquid crystal display panel defines a uniform array of pixels of a second size larger than the first, and the first and second panels are stacked so that each of the pixels of the second panel is optically superimposed over a plurality of pixels in the first panel.

4,966,442

ELECTRO-OPTICAL DEVICE AND METHOD FOR MANUFACTURING SAME

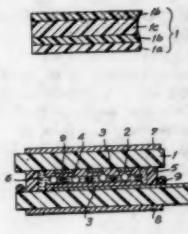
Yoichi Ono, Suwa; Kunio Fujii, Ohgaki; Shoji Hinata, and Satoshi Wakabayashi, both of Suwa, all of Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 305,892

Claims priority, application Japan, Feb. 2, 1988, 63-12869[U]; Feb. 4, 1988, 63-24395

Int. Cl.[5] G02F *1/133*

U.S. Cl. 350—339 R **12 Claims**



1. An electro-optical device, comprising:

a pair of opposed and spaced apart flexible substrates with a liquid crystal material therebetween;

each substrate being a composite substrate including a resin substrate base and having a phenoxy resin layer on the interior surface thereof,

a transparent electrode selectively deposited on the phenoxy resin layer for cooperating with the electrode on the opposed substrate for providing the electro-optical effect;

a transparent orientation film disposed across the electrodes on the interior surface of each substrate;

a plurality of non-conductive spacers fixed to the orientation film on one substrate; and

a plurality of non-conductive spacers disposed on the surface of the orientation film, the density of the non-conductive spacers between about 50 and 500/mm^2.

4,966,443

LIGHT BEAM SCANNER

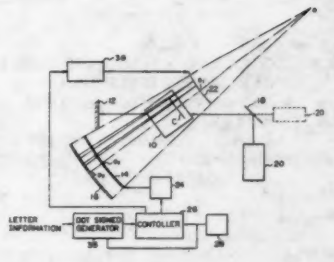
Hiroyuki Hiiro, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 22, 1989, Ser. No. 313,675

Claims priority, application Japan, Feb. 22, 1988, 63-38936; Feb. 22, 1988, 63-38937; Feb. 22, 1988, 63-38938

Int. Cl.[5] G02F *1/01*

U.S. Cl. 350—354 **19 Claims**



10. A light beam scanner comprising:

a phase-conjugate element group composed of a plurality of phase-conjugate elements juxtaposed to each other in a scanning direction;

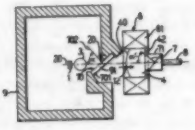
a light source for emitting a pumping light beam for exciting said plural phase-conjugate elements;
a reflecting mirror arranged to have its reflecting face facing said phase-conjugate element group;
an optical control element interposed between said phase-conjugate element group and said reflecting mirror and having a plurality of optical gates juxtaposed to each other in said scanning direction; and
a controller for controlling said optical gates to be opened or closed.

4,966,444

FEEDBACK-FREE OPTICAL ARRANGEMENT FOR CONVERTING POLARIZED LASER EMISSIONS INTO A CONVERGENT BEAM

Karsten Droegemueller, Munich; Franz Mayerhofer, Puchheim; Ekkehard Klement, and Ulrich Deserno, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 23, 1987, Ser. No. 137,080
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1987, 3700897
Int. Cl.[5] G02F *1/09*
U.S. Cl. 350—376 **20 Claims**



1. A feedback-free optical arrangement for converting a divergently emitted polarized laser emission from a semiconductor laser into an at least less divergent beam, comprising:
a first optical lens in a beam path of the laser emission from the semiconductor laser;
a second optical lens arranged following said first optical lens in a propagation direction of the laser emission from the semiconductor laser, said second optical lens having a curvature on at least one face and having an axis lying parallel to the propagation direction of the semiconductor laser;
an optical isolator formed of at least one polarizer in the beam path of the laser emission;
a Faraday rotator having said second optical lens as a component part; and
said second optical lens being disposed within said Faraday rotator.

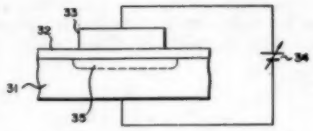
4,966,445

OPTICAL DEVICE USING MAGNETIC THIN FILMS AND ELECTRIC FIELD MEANS

Tsuneharu Takeda, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Sep. 13, 1989, Ser. No. 406,681
Claims priority, application Japan, Sep. 16, 1988, 63-229878
Int. Cl.[5] G02F *1/09*
U.S. Cl. 350—377 **17 Claims**

1. A magnetic apparatus comprising:
a magnetic thin film;
electric field applying means for changing a magnetic order-disorder transition temperature of said magnetic thin film upon application of an electric field to said magnetic thin film; and
optical control means for changing light radiated on said magnetic thin film between a light-transmitting state and a light-shielding state in correspondence with a change in polarizability on the basis of a magnetooptical effect accompanied by a change in magnetic order-disorder transition temperature of said magnetic thin film upon application of the electric field on said magnetic thin film.

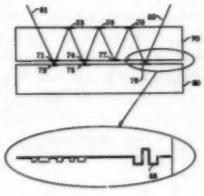


4,966,446

MASK CONTROLLED COUPLING OF INTER-SUBSTRATE OPTICAL COMPONENTS

Alan Huang, Middletown, and Jurgen Jahns, Shrewsbury, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 28, 1989, Ser. No. 345,754
Int. Cl.[5] B29D *11/00*; G02B *7/00, 3/08, 5/08*
U.S. Cl. 350—417 **15 Claims**



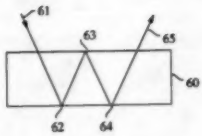
1. An optical structure including a substrate, planar optical devices fabricated onto a surface of said substrate and aligning means fabricated onto said surface concurrently with said planar optical devices and by the process by which said planar optical devices are fabricated.

4,966,447

INTEGRATION OF FREE-SPACE PLANAR OPTICAL COMPONENTS

Huang Alan, Middletown, and Jurgen Jahns, Shrewsbury, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 28, 1989, Ser. No. 345,760
Int. Cl.[5] B29D *11/00*; G02B *3/08, 7/00, 5/18*
U.S. Cl. 350—417 **20 Claims**



2. An optical structure comprising
a transparent substrate having two surfaces;
at least two reflective level B planar optical devices fabricated onto a first of said surfaces of said substrate which devices are substantially reflective for all frequencies of interest; and
a planar optical device fabricated on the second of said

surfaces and situated for optical interaction via said substrate with said reflective level B planar optical device on said first of said surfaces.

4,966,448

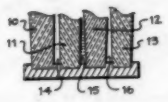
OPTIMIZED APOCHROMATIC LENS SYSTEMS USING INEXPENSIVE LENS ELEMENTS

Paul N. Robb, Sunnyvale, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 345,793, May 1, 1989, Pat. No. 4,913,535. This application Jul. 13, 1989, Ser. No. 379,454

Int. Cl.[5] G02B *3/12, 9/60*

U.S. Cl. 350—418 **7 Claims**



1. A lens system comprising four glass lens elements and a liquid lens element disposed coaxially along an optic axis, said liquid lens element being contained between two of said glass lens elements, said four glass lens elements being made of the same kind of glass and being of identical geometrical configuration, said four glass lens elements and said liquid lens element coacting with each other to focus optical radiation passing through said lens system onto a focal surface with a change in focus of less than one-quarter wavelength over a wavelength range from 0.48 micron to 0.72 micron.

4,966,449

TELEPHOTO LENS SYSTEM

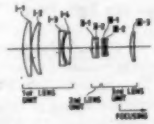
Koichi Maruyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1989, Ser. No. 384,619

Claims priority, application Japan, Jul. 30, 1988, 63-191161

Int. Cl.[5] G02B *13/02*

U.S. Cl. 0350—454 **11 Claims**



1. A telephoto lens system comprising, in order from the object side:

a first lens unit having a positive refractive power, said first lens unit comprising a positive first lens (I-1), a positive second lens (I-2), a negative third lens (I-3), and a positive fourth lens (I-4);

a second lens unit having a weak refractive power, said second lens unit comprising a cemented lens having a positive first lens (II-1) cemented to a negative second lens (II-2); and

a third lens unit having a negative refractive power and which performs focusing for an object at a finite distance by movement of said third lens unit, said third lens unit comprising at least one negative lens element and at least one positive lens element;

wherein said system satisfies the following conditions (1)–(7):

$$0.26<f_{I\text{-}1,2}/f<0.34 \quad (1)$$

$$0.40<f_I/f<0.58 \quad (2)$$

$$35<\nu_{IP}-\nu_{IN} \quad (3)$$

$$-2.8<\frac{f(n_{II\text{-}2}-n_{II\text{-}1})}{r_{II\text{-}2}}<-1.6 \quad (4)$$

$$0.16<n_{II\text{-}2}-n_{II\text{-}1} \quad (5)$$

$$0.075<n_{III\,N}-n_{III\,P} \quad (6)$$

$$-1.00<f/f_{II}<0.04 \quad (7)$$

where f: overall focal length of the telephoto lens system

$f_{I\text{-}1,2}$: composite focal length from said lens I-1 to said lens I-2

f_I: composite focal length of said first lens unit

νIP: an average of Abbe numbers of positive lenses in said first lens unit

ν_{IN}: an average of Abbe numbers of negative lenses in said first lens unit

$r_{II\text{-}2}$: radius of curvature of a cemented surface of said second lens unit

$n_{i,j}$: refractive index at a d-line of a j-th lens in an i-th lens unit as counted from said object side

n_{IIIN}: an average of refractive indices at said d-line of negative lenses in said third lens unit

n_{IIIP}: an average of refractive indices at said d-line of positive lenses in said third lens unit

f_{II}: a composite focal length of said second lens unit.

4,966,450

LIGHT RADIATION STAND

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 335,170

Claims priority, application Japan, Jul. 1, 1988, 63-87849

Int. Cl.[5] G02B *7/18, 11/04;* F21V *21/14;* A61N *5/06*

U.S. Cl. 350—603 **9 Claims**

1. A light radiation stand for holding a light emitting end of a light-transmitting fiber optic cable, characterized in that said light radiation stand comprises a stand base, one or more deformable flexible conduits vertically installed on the upper part of said base, a fiber optic cable holding means mounted on the tip end portion of each conduit and a mirror integrally mounted to the base.

4,966,451
EYEGLASS FLOTATION APPARATUS

Edward D. Corral, 6046 N. 21st Dr., Phoenix, Ariz. 85015, and Steven R. Lopez, 4927 W. McClellan Rd., Glendale, Ariz. 85301

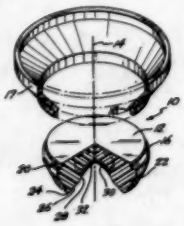
Filed Apr. 5, 1989, Ser. No. 333,613
Int. Cl.[5] G02C 1/00, 5/22
U.S. Cl. 351—43 13 Claims

1. A flotation device for eyeglasses having temples extending from a lens enclosing frame, said device comprising in combination:
(a) a pad extending longitudinally along a temple for providing flotation;
(b) a channel extending longitudinally through said pad for receiving one of the temples, said channel comprising a first slit extending from a side of said pad and a second slit intersecting said first slit to form a T shaped channel; and
(c) means for restraining lateral disengagement of said pad from the temple.

4,966,452
CONTACT LENS FOR LASER SURGERY

M. Bruce Shields, Durham, N.C., and Phillip J. Erickson, Bellevue, Wash., assignors to Ocular Instruments, Inc., Seattle, Wash. and Duke University, Durham, N.C.

Filed Apr. 27, 1989, Ser. No. 344,711
Int. Cl.[5] A61B 1/00; G02C 7/04
U.S. Cl. 351—219 7 Claims

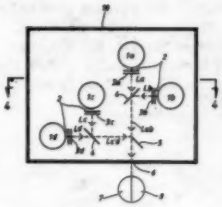


1. A lens for use in ophthalmic surgery comprising:
a contact lens having an entry surface and a frustoconically-shaped exit surface, said exit surface being angled superiorly toward said entry surface and inwardly relative to the optical axis of said lens, said entry surface being adapted to contact a region on the sclera surrounding the cornea, said lens having a concave recess located inwardly from said exit surface, said recess having a curvature slightly steeper than the average human cornea, said recess being adapted to protect but be spaced from the corneal epithelium when said exit surface contacts said sclera.

4,966,453
FOUR-CHANNEL ANOMALOSCOPE

Yin Chang, and Yao A. Fu, both of Taipei, Taiwan, assignors to National Science Council, Taipei, Taiwan

Filed Aug. 8, 1989, Ser. No. 390,753
Int. Cl.[5] A61B 3/06
U.S. Cl. 351—242 20 Claims



1. A four-channel anomaloscope comprising:
a housing;
an optical means disposed within said housing;
circuit control means connected to said optical means by connecting wires for controlling the operation of said optical means; and
a suitable computer and applied software programs which are used in combination with said circuit control means to accurately control the operation of said optical means; wherein
an intermediate plate is disposed inside said housing which is permeable to air, said intermediate plate separates the interior of the housing into an upper and a lower layers, a side of the housing in the upper layer portion being provided with a penetrating hole, a plurality of small holes being provided on the top wall of the housing for dissipating heat therefrom, the upper layer portion of said housing serving to receive the optical means and forming into a light chamber, and said housing having heat dissipating means mounted on the bottom of the lower layer portion thereof thus forming into an air chamber;
said optical means comprising:
a plurality of lighting bulbs;
a plurality of filters of single wavelength, interference type being each provided at a position adjacent the respective bulbs, the light rays emitted from respective bulbs being adjusted thereby to become light beams of different single wavelengths;
a plurality of 50/50 spectroscopes being each disposed at the intersection of the two light beams having different wavelengths, and the light beams from the different light paths being mixed thereby;
a reflective mirror for the light beams which are mixed by said spectroscopes to pass through said penetrating hole on the housing so as to form into a bipartite field; and
a plurality of photodiodes being provided after said interference type filters for sensing the intensity of the four light beams of different wavelengths for the purpose of negative feedback automatic control.

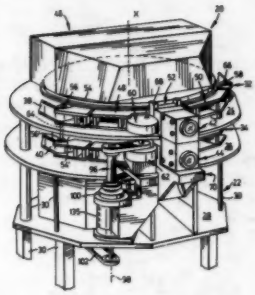
4,966,454
3-D MOTION PICTURE PROJECTOR

Marian Toporkiewicz, Toronto, Canada, assignor to Imax Systems Corporation, Canada

Filed Sep. 8, 1989, Ser. No. 404,472
Int. Cl.[5] G03B 35/00
U.S. Cl. 352—59 10 Claims

1. A 3-D motion picture projector for projecting corresponding series of "left eye" and "right eye" images from respective film strips, the projector comprising:
first and second rolling loop film transport mechanisms for the respective said film strips, each mechanism including

stator means having an aperture, a rotor co-operating with the stator means to define a film passage, the rotor having gaps for receiving film loops and being rotatable with respect to the stator means, means for moving the relevant film strip through said passage, means for locating said film strip in registration with said aperture, and film deceleration means comprising a cam unit having means for releasably engaging a said film strip to decelerate said film for engagement with said film locating means, said cam unit having a vertical rotational axis; said first and second rolling loop film transport mechanisms being located in



vertically superposed relationship with said rotors rotatable about a common vertical axis;

means for projecting light through each of said apertures;

a projection lens assembly in association with each said aperture; and,

means supporting the lower one of said cam units for movement between an operative position for decelerating film in the lower of said rolling loop film transport mechanisms, and an inoperative position in which the lower cam unit is clear of the upper cam unit for permitting access to the lower cam unit.

4,966,455

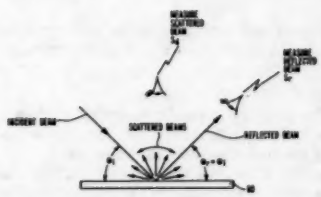
REAL TIME MOTTLE MEASURING DEVICE AND METHOD

Eitan Avni, Langhorne, Pa., and Sal A. Pace, Trenton, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Dec. 5, 1988, Ser. No. 280,166

Int. Cl.[5] G01N *21/47, 21/57;* G01J *4/00*

U.S. Cl. 356—73 **17 Claims**



1. A device for measuring mottle of a paper-like material, comprising:

(a) radiation source means for directing a radiation on said paper-like material, said radiation source means comprising light source means having polarization means for producing a light on said paper-like material at a specified reflection angle;

(b) scanning means for scanning said radiation in a plurality of directions on said paper-like material;

(c) detector means for detecting at least a radiation scattered by said paper-like material and for providing an output representative of a detected amount of scattered radiation;

(d) processing means for receiving said output of said detector means and for providing a reading proportional to the mottle of the paper-like material.

4,966,456

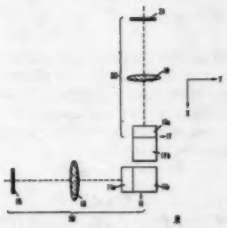
SPECTRAL ANALYZER AND DIRECTION INDICATOR AND AIRCRAFT LANDING SYSTEM APPLICATION

Gordon A. Shifrin, Malibu, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 737,114, May 23, 1985. This application Jun. 30, 1989, Ser. No. 374,206

Int. Cl.[5] G01J *3/36;* G01B *11/26*

U.S. Cl. 356—73 **12 Claims**



1. A spectral analyzer and direction indicator system for receiving collimated or essentially collimated incident radiation comprising:

first optical means responsive to the collimated or essentially collimated incident radiation for providing non-dispersed optical information indicative of incidence direction and for providing spectrally dispersed optical information;

first detector means responsive to said non-dispersed optical information and said dispersed optical information from said first optical means for providing detected information for identifying as to the collimated or essentially collimated incident radiation a first angular incidence direction and the spectral content;

second optical means responsive to the collimated or essentially collimated incident radiation for providing non-dispersed optical information indicative of incidence direction of the incident radiation and for providing spectrally dispersed optical information; and

second detector means responsive to said non-dispersed optical information and said dispersed optical information from said second optical means for providing detected information for identifying as to the collimated or essentially collimated incident radiation a second angular incidence direction and the spectral content.

4,966,457

INSPECTING APPARATUS FOR DETERMINING PRESENCE AND LOCATION OF FOREIGN PARTICLES ON RETICLES OR PELLICLES

Fuminori Hayano, Kamakura; Kazunori Imamura, Tokyo, and Sunao Murata, Kawasaki, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 298,920

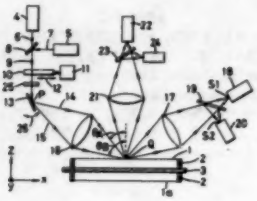
Claims priority, application Japan, Jan. 21, 1988, 63-11725

Int. Cl.[5] G01N *21/88*

U.S. Cl. 356—237 **13 Claims**

1. A defect inspecting apparatus for determining the presence of a defect element adhering to either of the front and back surfaces of a thin film-like object to be inspected having a light-transmitting property, comprising: applying means for applying two light beams of different wavelengths to one surface of said object to be inspected along an optical path

leading to said object; incident angle varying means for varying the incident angle of said two light beams onto said one surface; first photoelectric detector means for receiving light of said two light beams reflected by or transmitted by said object to be inspected; second photoelectric detector means for



receiving light of said two light beams scattered by said defect element; and discriminating means for discriminating the surface of said object to be inspected to which said defect element adheres on the basis of a detection output of said first photoelectric detector means and a detection output of said second photoelectric detector means.

4,966,458

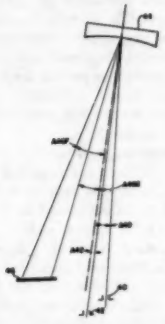
OPTICAL SYSTEM FOR A MULTIDETECTOR ARRAY SPECTROGRAPH

Richard Burns, Webster; James Defendorf, Rochester; Edward King, Fairport, and Cornelius McCarthy, Pittsford, all of N.Y., assignors to Milton Roy Company, Peterburg, Fla.

Continuation-in-part of Ser. No. 191,262, May 6, 1988, Pat. No. 4,875,773. This application May 26, 1989, Ser. No. 357,980

Int. Cl.[5] G01J *3/18*

U.S. Cl. 356—328 **4 Claims**



1. An apparatus for the measurement of light intensity by wavelength comprising:

a concave grating for the dispersion and focusing of light by wavelength; said concave grating having a preferred plane to disperse light and having a normal lying in said preferred plane relative to which angles may be defined as rotations around a rotation point located at the intersection of said normal and the surface of said grating,

detector means optically coupled to said concave grating for the conversion of light energy to electrical energy indicative of said light intensity; said detector means comprising a plurality of light sensitive elements, said detector means being positioned such that said light sensitive elements are present at or between angles of 8.3 and 14.4 degrees from the grating normal,

a first port for entrance of light to the apparatus; the center of said first port being at a specific first angle chosen to be between −0.3 and −5.4 degrees from the grating normal, the location of said first port along a line defined by said chosen first angle and said rotation point selected so as to obtain optimum focus of light entering at said first port at said detector means by said grating, and

a second port for entrance of light to the apparatus; the center of said second port being at a specific second angle chosen to be between −0.3 and −5.4 degrees from the grating normal, the location of said second port along a line defined by said chosen second angle and said rotation point selected so as to obtain optimum focus of light entering at said second port at said detector means by said grating.

4,966,459

BROADBAND OPTICAL DETECTION OF TRANSIENT MOTION FROM A SCATTERING SURFACE

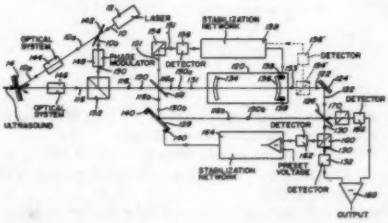
Jean-Pierre Monchalin, Montreal, Canada, assignor to Canadian Patents and Development Limited-Societe Canadienne des Brevets et d'Exploitation Limitee, Canada

Filed Feb. 15, 1989, Ser. No. 310,380

Claims priority, application Canada, Apr. 29, 1988, 565550

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—358 **25 Claims**



1. A method of optically detecting transient motion from a scattering surface, which comprises the steps of:

(a) directing a laser beam having a predetermined frequency onto said surface to thereby scatter said laser beam and produce a scattered laser beam defining an optical wavefront and having an optical spectrum with a central peak at said predetermined frequency and a sideband on either side of said central peak;

(b) causing the laser beam scattered by the surface to interfere with a reference beam derived from the scattered laser beam and having an optical wavefront substantially matching the wavefront of said scattered beam and an optical spectrum with a single peak at said predetermined frequency and no sidebands, to obtain an optical signal; and

(c) detecting said optical signal and converting same into an electrical signal representative of the transient motion.

4,966,460

LASER GAUGING OF ROTARY CUTTING TOOLS

Theodore E. Kahley, Rockford, Ill., assignor to The Ingersoll Milling Machine Company, Rockford, Ill.

Continuation of Ser. No. 114,195, Oct. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 91,533, Aug. 31, 1987, abandoned. This application Jun. 20, 1989, Ser. No. 369,043

Int. Cl.[5] G01B *11/10*; B23Q *17/24*

U.S. Cl. 356—387 **12 Claims**

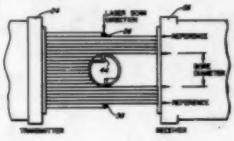
1. Apparatus for gauging a rotary cutting tool while rotating in the spindle of a machine tool, comprising:

a transmitter for producing a scanning laser beam movable perpendicularly of itself in a scanning plane through a predetermined scanning range at a predetermined velocity and with a scanning frequency which is a substantial mixed number multiple of the rotational frequency of the tool chosen to rotate the image of the tool slowly relative to the scanning frequency,

a light-sensing receiver positioned to detect the impingement of the moving laser beam thereupon,

means for positioning said transmitter and receiver on opposite sides of the spindle axis and with the cutting tool breaking the scanning plane within said scanning range, and

means for slowly moving the cutting tool axially through



the scanning plane to assure the exposure of the cutting tip of the cutter to the scanning beam, and

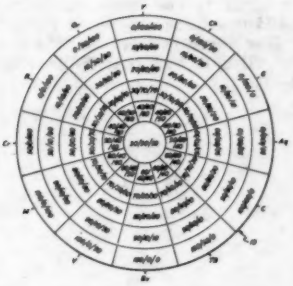
means for measuring the minimum elapsed time of the sensed impingement of the scanning laser upon the receiver during multiple successive scans of the laser beam between an edge of the scanning range and the nearest encountered point of said tool as a measure of the distance between said edge and said nearest point.

4,966,461

COLOR IDENTIFICATION SYSTEM

Donald H. Hooper, 304 Tom Tom St., Chittenango, N.Y. 13037

Filed Aug. 25, 1989, Ser. No. 398,641
Int. Cl.[5] G01J *3/51, 3/52*
U.S. Cl. 356—406 **11 Claims**



1. A method of constructing a hue compass for objectively identifying any particular color with regard to its primary color content that includes the steps of

locating a sequence of spaced color sites about the rim of a hue compass;

positioning three primary colors at sites located about said disk compass which are at 120 degree intervals;

locating respective secondary color sites for colors that are complements of said primary colors at stations diametrically opposite the associated said complementary primary color sites whereby each said secondary color site is situated midway between the remaining two primary color sites on the rim;

assigning a triplet color identification number to each primary and secondary color site identifying relating to its percentage primary color content so that said first primary color site is identified 100/0/0, said second primary color is identified 0/100/0, and said third primary color site is identified 0/0/100 and the triplet sum of a primary color site identification number and its complementary secondary color site triplet identification number always equals 100/100/100;

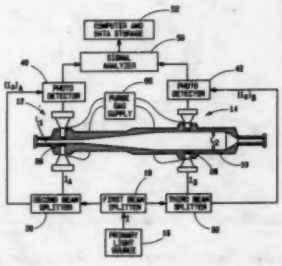
locating tertiary colors at sites equidistant between said primary color sites and the neighboring secondary color sites on the rim and assigning each tertiary color site a triplet color identification number that is an average of the adjacent primary and secondary color site triplet identification numbers whereby the sum of any two triplet identification numbers relating to color sites that are situated opposite each other on the rim of the compass equals 100/100/100.

4,966,462

SERIES CELL LIGHT EXTINCTION MONITOR

Vincent J. Novick, Downers Grove, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 15, 1989, Ser. No. 310,128
Int. Cl.[5] G01N *21/05, 15/06, 21/59*
U.S. Cl. 356—437 **14 Claims**



1. A device for determining number concentration of an aerosol comprising:

a chamber capable of conveying the aerosol with a known gas volumetric flow rate,

a primary light source capable of providing light to the interior of said chamber at a first location and at a second location separated from the first location,

a first light detector cell capable of measuring the extinction of light across said chamber from the first location,

a second light detector cell capable of measuring the extinction of light across said chamber from the second location,

whereby the number concentration of the aerosol can be determined in accordance with the formula

$$\frac{L_2 \ln[I_A/(I_O)_A]}{L_1 \ln[I_B/(I_O)_B]} = 1 + ktN_A$$

where

L_1 is the path length of a light beam across said chamber from said light source to said first light extinction cell,

I_A is the transmitted light intensity measured through the aerosol at said first light extinction cell,

$(I_O)_A$ is the transmitted light intensity measured at said first light extinction cell without the aerosol,

L_2 is the path length of a light beam across said chamber from the light source to said second light extinction cell,

I_B is the transmitted light intensity measured through the aerosol at said second light extinction cell,

$(I_O)_B$ is the transmitted light intensity measured at said second light extinction cell without the aerosol,

k is the coagulation coefficient (cm^3/s),

t is the coagulation time (s), and

N_A is the number concentration at the first light extinction cell (cm^{-3}).

4,966,463

MIXER UNIT FOR CELLULAR CONCRETE PASTE AND METHOD OF MAKING SUCH PASTE

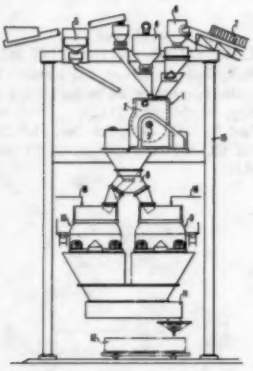
Mikio Hihara, and Nobuhisa Suzuki, both of Fuji, Japan, assignors to Nisset Plan, Inc., Japan

Filed Aug. 22, 1988, Ser. No. 234,948

Claims priority, application Japan, May 17, 1988, 63-119739; May 17, 1988, 63-119740

Int. Cl.[5] B01F *13/02*

U.S. Cl. 366—3 5 Claims



1. A cellular concrete paste mixer unit comprising:

a frame,

at least one first mixer, each first mixer adapted for receiving cement, water, aggregate, and additives, each first mixer having means for agitating the cement, water, aggregate and additives to produce a cement paste, each first mixer adapted to discharging the cement paste,

a plurality of inlets for supplying cement, water, aggregate and additives to each first mixer,

at least two second mixers adapted for receiving the cement paste produced by at least one first mixer, each of the second mixers adapted for receiving a bubbled frother solution, each of the second mixers having means for agitating the cement paste and the bubbled frother solution to produce a cellular concrete paste,

at least one inlet for supplying the bubbled frother solution to each of the second mixers, and

a connection having a change-over valve, said connection fluidly connected to each first mixer and each of the second mixers for conveying the cement paste from each first mixer to the second mixers,

wherein the number of second mixers is always larger than the number of first mixers.

4,966,464

FUSING APPARATUS FOR THERMAL TRANSFER PRINTS

Robert J. Matoushek, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 26, 1989, Ser. No. 457,037

Int. Cl.[5] G01D *15/10*

U.S. Cl. 346—76 P H 12 Claims

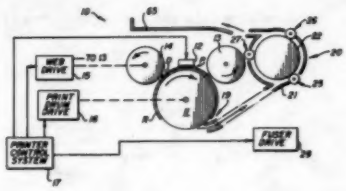
10. In a thermal transfer printer having a print system for producing a receiver sheet bearing a transferred dye image, a fusing device comprising:

(a) a cylindrical fuser drum comprising a metal interior shell portion with a resilient exterior cover;

(b) three roller means respectively mounted for rotation on parallel axes located at generally equal-distance around the periphery of said fuser drum to constrain the path of drum rotation;

(c) means for providing rotary drive to one of said roller means;

(d) means for mounting another of said roller means for urging it toward said fuser drum;



(e) a source of radiant energy mounted within said shell interior; and

(f) guide means for directing a print sheet around the periphery of said fuser drum and between the nips of at least two of said roller means with said shell.

4,966,465

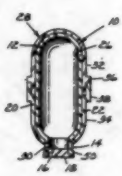
METHOD FOR STORING, MIXING AND DISPENSING DENTAL MATERIALS

Ronald M. Randkley, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 2, 1988, Ser. No. 266,410

Int. Cl.[5] B01F *3/12, 11/00;* B65D *25/08*

U.S. Cl. 366—111 8 Claims



1. A method for storing, mixing and dispensing a preparation comprising the steps of:

providing an ampule having a closed internal chamber predosed with a measured quantity of a first component,

said ampule having an overall configuration of dimensions sufficiently small such that opposite sides of said ampule are substantially covered when grasped between the distal phalange segments of a user's thumb and finger;

opening an aperture in a wall of said ampule to provide access to said chamber;

introducing a second component through said aperture and into said chamber;

closing said aperture;

oscillating said ampule to mix said first component and said second component within said chamber and form a preparation;

establishing an outlet opening in said wall of said ampule;

substantially covering opposite sides of said ampule by grasping the ampule between the distal phalange segments of a user's thumb and finger; and

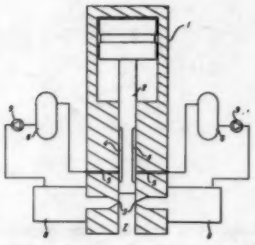
compressing said ampule between said thumb and said finger to expel preparation through said outlet opening.

4,966,466

IMPINGEMENT MIXING DEVICE WITH PRESSURE CONTROLLED NOZZLE ADJUSTMENT

Wolfgang Soechtig, Germering, Fed. Rep. of Germany, assignor to Krauss-Maffei A.G., Fed. Rep. of Germany

Division of Ser. No. 119,127, Nov. 10, 1987, Pat. No. 4,854,713.
This application Jun. 8, 1989, Ser. No. 367,571
Int. Cl.[5] B01F *15/02*
U.S. Cl. 366—132 3 Claims



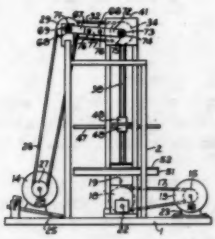
1. An impingement mixing head comprising:
means for defining a component impingement zone;
at least two means for introducing component into said impingement zone connected to said means for defining;
wherein said means for introducing includes:
an axially displaceable nozzle needle arranged in a nozzle housing connected to said means for defining;
a continuously adjustable drive connected to said nozzle needle.

4,966,467

VIBRATORY MIXERS

Alan S. Johnson, Maidenhead, United Kingdom, assignor to Red Devil, Inc., Union, N.J.

Filed Mar. 1, 1988, Ser. No. 162,548
Claims priority, application United Kingdom, Jul. 1, 1986, 8616034
Int. Cl.[5] B01F *11/00, 3/12*
U.S. Cl. 366—209 33 Claims



1. A vibratory mixer for mixing ingredients by shaking comprising:
a load platform (51) for receiving a container (88) which holds the ingredients to be mixed, clamping means (28, 42, 47) cooperable with the load platform to clamp a container therebetween, means (14, 26 to 48) for effecting relative movement between the load platform and the clamping means so as to clamp and unclamp a container, said means comprising at least one lead screw (38, 42) and a first motor (14) operable to drive said at least one lead screw, means for permitting axial movement of said at least one lead screw in response to clamping and unclamping of said clamping means (42), a second motor (13) operable to shake the load platform (51), control means operable to control a sequence of operation of the apparatus, said control means including switch means (65) connected in circuit with the first motor (14), said switch means being actuatable by said axial movement of said at least one lead screw (42) which takes place due to the reaction of a container (88) being clamped between the load platform (51) and the clamping means (47), whereby the first motor (14) is deenergized at a predetermined axial displacement of said at least one lead screw.

4,966,468

MIXING DEVICE

Werner Brüning, Engelskirchen-Ründeroth, Fed. Rep. of Germany, assignor to Alfred Fischbach KG, Fed. Rep. of Germany

PCT No. PCT/EP88/00631, § 371 Date Jan. 18, 1989, § 102(e) Date Jan. 18, 1989, PCT Pub. No. WO89/00536, PCT Pub. Date Jan. 26, 1989
PCT Filed Jul. 12, 1988, Ser. No. 328,362
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723309
Int. Cl.[5] B01F *5/12*
U.S. Cl. 366—333 10 Claims

1. Mixing device for mixing or homogenizing pasty or flowable compositions comprising
a tubular cartridge (10), having at its one end a front wall (11), while its other end (12) is open,
a mixing member (20) accommodated in the cartridge (10) and connected to a rod (23) extending out of the open cartridge end,
and a piston (15) for squeezing out the cartridge content, characterized in that the piston (15) has an axial passage opening (19) for the rod (23) or for a shaft (22) projecting from the mixing member (23), the rod (23) is detachably connected to the mixing member (20), the piston (15) includes a holding member (32), and said holding member (32) defines means for retaining the mixing member (20) against rotation as said mixing member (20) is separated from the rod (23).

4,966,469

POSITIONING DEVICE FOR TEMPERATURE SENSOR IN FREEZE DRYING

Douglas S. Fraser, Bloomington, and Taylor N. Thompson, Sr., Kingston, both of N.Y., assignors to FTS Systems, Inc., Stone Ridge, N.Y.

Filed Jan. 2, 1990, Ser. No. 459,534
Int. Cl.[5] F26B *21/10*
U.S. Cl. 374—208 7 Claims

1. In a flask for freeze drying, a positioning device for a temperature sensor, comprising:
a. a generally circular stopper having an opening approximately in its center, said stopper being snap-fittingly secured to the top of said flask;
b. a central, annular tube extending through said opening and into said flask; and

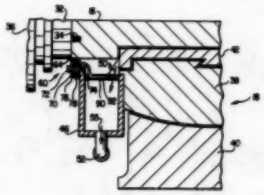
c. a thermocouple coiled around and supported by said annular tube, said thermocouple being retractable and

extensible to permit the use of said thermocouple in flasks of various lengths.

4,966,470
TAMPER-EVIDENT, RECLOSABLE, FLEXIBLE PACKAGES
Bjorn J. Thompson, Madison; Gerald O. Hustad, McFarland, and Todd S. Marnocha, Sun Prairie, all of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.
Filed Feb. 24, 1989, Ser. No. 315,352
Int. Cl.[5] B65D *33/34, 33/02*
U.S. Cl. 383—61 **7 Claims**

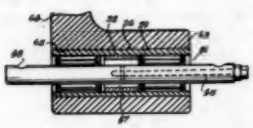
1. In a reclosable, flexible package wherein a product is hermetically sealed between opposed wall panels, wherein the package is permanently sealed about its bottom and side periphery and is sealed with a hermetic peel seal adjacent to the product towards the top of the package and wherein the package has a reclosure seal comprised of interlocking closure strips and located adjacent and peripheral to the hermetic peel seal and below the top edges of the package, the improvement comprising a tamper-evident feature located above the reclosure seal of the package wherein visible disruption of the tamper-evident feature is necessary in order to gain access to the reclosure seal and wherein the tamper-evident feature can be fully disrupted by digital forces, and said tamper-evident feature includes separate reinforcing strip having respective opposing edges bonded to respective surfaces of the top portions of the respective wall panels across the width of the package so as to provide a U-shaped strip joint between the respective top portions of the wall panels, the strip having a pair of opposed tear lines, the tear lines being disposed in said reinforcing strip apart from said package opposed sidewalls such that the portion of the reinforcing strip located above said tear lines needs to be torn off in order to gain access tot he reclosure seal without the necessity of tearing said opposed package sidewalls.

4,966,471
TRUNNION BEARING DUST SEAL
Norman K. Trozzi, Caldwell, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.
Filed Jan. 8, 1990, Ser. No. 461,725
Int. Cl.[5] F16C *33/74*
U.S. Cl. 384—151 **19 Claims**



1. A seal assembly for a rotating drum comprising a trunnion secured relative to said drum for rotation therewith, a fixed member supporting said trunnion, at least one seal ring, and means mounting said seal ring relative to said fixed member and in sealing engagement with said trunnion, said mounting means including tension means for adjustably biasing said seal ring against said trunnion, said tension means including means circumscribing the periphery of said seal ring.

4,966,472
ROLLER BUSHING
Larry R. Link, 906 Huntsmoor Dr., Frankfort, Ill. 60423
Filed Jul. 17, 1989, Ser. No. 380,859
Int. Cl.[5] F16C *33/66*
U.S. Cl. 384—474 **9 Claims**



1. A roller bushing assembly for use in a leaf spring suspension system to pivotally support an end of a leaf spring to allow a leaf spring to flex more easily, said roller bushing assembly comprising:

a housing for the roller bushing assembly having a wall defining a cylindrical hollow internal bore,

a pair of roller bearings mounted in the bore and having rolling elements,

an outer race on each of the roller bearings for rolling contact with the internal rolling elements,

said roller elements each having inner surfaces and defining an internal opening within the roller bearings,

a shaft mounted in the internal openings in the roller bearings for support and for relative oscillation with rolling surface contact between the inner surfaces on the rolling elements and the shaft,

a grease means in said housing for retaining grease for lubrication of the rolling elements,

a precisely machined surface on said shaft machined to predetermined tolerances to have a close fit with the bearing element inner surfaces to reduce road pounding motion therebetween and being highly polished to pro-

vide smooth rolling surface engagement with the bearing inner surfaces,

a precisely machined and highly polished surface on said housing for supporting the outer races of the roller bearings,

the rolling elements rolling relative to the outer races and said machined shaft surface so that the vehicle suspension load is carried between hard polished machined surfaces with the rolling elements providing a low friction oscillatory movement for the end of the leaf spring to reduce the friction and thereby allow the leaf spring to flex more easily.

4,966,473

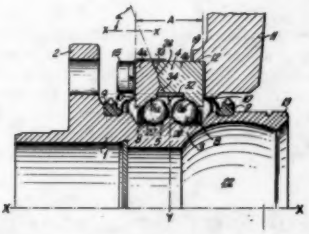
BEARING ASSEMBLY FOR A WHEEL OF A MOTOR VEHICLE

Werner Jacob, Briandring 29, D-6000 Frankfurt am Main 70, Fed. Rep. of Germany

Division of Ser. No. 220,481, Dec. 14, 1987, Pat. No. 4,917,510. This application Oct. 27, 1989, Ser. No. 428,129

Int. Cl.[5] F16C *33/60*

U.S. Cl. 384—477 **5 Claims**



1. A bearing assembly of a driveable wheel hub at an associated wheel carrier of a motor vehicle, comprising a double-row rolling element bearing having an outer divided bearing ring (4) provided so as to be flexible to the wheel carrier, and an inner single-part bearing ring (3) arranged so as to form a single unit with a wheel flange for attaching the vehicle wheel, the outer bearing ring (4) being broken apart in an area (24) of its circumferential extension so as to be divided into two parts, said area (24) being essentially conical about a rotary axis ($x \geqq x$) of the assembly, each of said two parts including a track (*6a*, *6b*) for one row of said double-row rolling element, the inner bearing ring being integral with a component (13) of a driving joint (22) provided for driving the vehicle wheel or connected to said component.

4,966,474

LOCKABLE NUT FOR AXIAL ADJUSTMENT

Robert E. Geiger, Sayre, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jun. 1, 1989, Ser. No. 359,557

Int. Cl.[5] F16C *1/00*

U.S. Cl. 384—517 **6 Claims**

1. A system for centering a rotating member between first and second stationary housing members comprising:

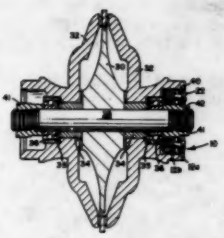
a shaft rotatable with said rotating member and having first and second ends;

first and second bearings, one bearing positioned on each side of said rotating member so as to support said shaft for rotation relative to said first and second stationary housing members;

first and second spacer members, one spacer member positioned abutting each side of said rotating member so as to axially space each bearing from said rotating member;

first and second resilient members, one resilient member axially positioned between each bearing and stationary housing member inboard of said bearing and outboard of said housing so as to bias each bearing axially away from said housing member;

an end piece on each end of said shaft so as to fix the outward position of each bearing and spacer member; and



an adjusting member adjustably engaged with said second stationary housing member and in abutting contact with said second bearing so as to adjust the outward position of said second bearing and spacer member relative to said second stationary housing member.

4,966,475

BEARING SUPPORT WITH ADDITIONAL AXIALLY RESILIENT RING

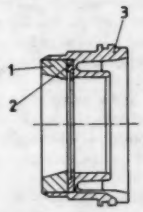
Gerhard Ankenbauer, Rotenburg; Oswald Bayer, Aidhausen; Jan De Boer, Madenhausen, and Thomas Rasp, Schweinfurt, all of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Feb. 15, 1990, Ser. No. 480,579

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906783

Int. Cl.[5] F16C *43/04*

U.S. Cl. 384—584 **9 Claims**



1. A bearing support and ring combination for an antifriction bearing comprising:

a bearing support with a bore through it;

an antifriction bearing ring disposed within the bore of the support, the ring having a first and a second axial side; the ring having a periphery;

an axially resilient ring-shaped part disposed at the first axial side of the ring; the part having a periphery, a third axial side toward the first side of the ring and an opposite fourth axial side facing away from the ring;

the bearing support being cast around the peripheries of the ring and the part and also being cast on the fourth side of the part, whereby the part is axially resilient between the bearing support on one axial side thereof and the antifriction bearing ring on the other side thereof.

4,966,476

TAPE PRINTER

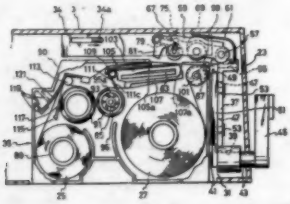
Susumu Kuzuya, Gifu; Yoshiaki Nagao; Hideo Asakura, both of Nagoya, and Shigenori Hattori, Aichi, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Dec. 28, 1988, Ser. No. 291,286

Claims priority, application Japan, Dec. 29, 1987, 62-199662[U]; Oct. 17, 1988, 63-135230[U]; Oct. 17, 1988, 63-135277[U]

Int. Cl.[5] B41J *35/28, 11/04*

U.S. Cl. 400—208 **12 Claims**



1. A tape printer comprising:

a frame within which a printing area is defined;

a printing head and a platen both disposed in the printing area in said frame, said platen being relatively movable between an inoperative position, at which the printing head and the platen are spaced apart, and an operative position, at which the printing head and the platen are in contact with each other;

biasing means;

disabling means; and

a tape cassette for being detachably loaded in said frame when said printing head and platen are at said inoperative position;

said tape cassette including:

a housing having a tape outlet;

an image source tape and an image receiving tape both accommodated in said housing and both being driven through between said printing head and platen;

a recess permitting advancement and retreat of said printing head in accordance with the loading and unloading of said tape cassette in and out of said frame; and

tape guide means for guiding a portion of said image source tape facing said platen;

said printing head being secured to said frame and said platen being movable between said operative position and said inoperative position, wherein:

said portion of said image source tape facing said platen partially extends in said recess;

said biasing means biasing said portion of said image source tape facing said platen outwardly of said recess and away from a tape path loading to said printing head; and

said disabling means disabling the biasing of said biasing means in response to the loading of said tape cassette in said frame.

4,966,477

PAPER HOLDER FOR POSITIONING UNDERSIZED PAPER IN A TYPEWRITER

Sheila R. Vitale, 59-147B Piedmont Dr., Port Jefferson Station, N.Y. 11776

Filed Jul. 27, 1987, Ser. No. 77,726

Int. Cl.[5] B41J *13/12*

U.S. Cl. 400—522 **7 Claims**

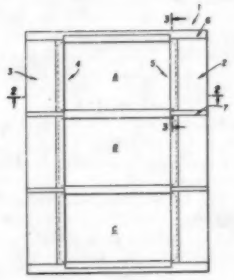
1. A paperholder for undersized paper products comprising:

a flexible backing sheet having opposed margins and sized to be securely positionable in a conventional typewriter mechanism;

a flexible strip adhered to each opposed margin of said backing sheet and forming a recess with said backing sheet;

said flexible strip and said flexible backing sheet defining upper and lower surfaces for said recess;

an outer boundary for said recess being formed where said flexible strip joins said backing sheet;



cross members also mounted on said backing sheet for defining upper and lower boundaries for said recess and said recess being aligned to an opposing recess in said flexible strip on the opposed margin of said flexible backing sheet so that an undersized paper product may be positioned therein and held in firm alignment to said flexible backing sheet.

4,966,478

MECHANICALLY CONTROLLED-WRITING APPARATUS WITH PRESHARPENED PENCIL LEAD ELEMENTS

Chun-Liang Kuo, 1st Fl., No. 17, Alley 23, Lane 2, Chung Shan N. Rd., Sec. 6, Taipei, Taiwan

Filed Aug. 14, 1989, Ser. No. 393,807

Int. Cl.[5] B43K *21/16*

U.S. Cl. 401—57 **5 Claims**

1. A writing implement comprising an elongated annular outer casing (10), an inner tube (20) slidably mounted within said outer casing, and a plurality of sharpened writing elements (30) stacked in axial alignment within said tube;

said outer casing comprising an elongated annular member having first and second end sections; said first end section being configured as a tapered frusto-conical wall section (15); a first essentially V-shaped slit (271) extending through said tapered wall section to form an axially elongated resilient leg (12) integral with the tapered wall section; said resilient leg having a cantilever connection with the associated wall section, a free end spaced a short distance axially from the end edge of the tapered wall section, and a hook section (13) extending generally radi-

ally inwardly from the free end of said leg (12), said hook section being integral with the leg;

said first resilient leg having a normal unstressed position wherein its outer side surface lies in the outer surface plane of the tapered wall section; said resilient leg having a stressed position wherein its outer side surface projects outwardly beyond the outer surface plane of the tapered wall section;

said outer casing having a second essentially V-shaped slit (271) spaced axially from said first V-shaped slit to define a second resilient leg; the apex portions of the two Vs facing in opposite directions, with the wall areas circumscribed by the two V-shaped slits being integrally connected, such that inward manual pressure on the second leg produces an outward deflection of the first leg from its normal unstressed position;

said tube having a radially enlarged element gripper end section (28) adapted to move between a retracted position extending a relatively short distance out of the tapered wall section, and an extended position projecting a relatively great distance beyond said tapered wall section; two diammetrically spaced slots (23 and 24) formed in said tube end section so that said end section forms a gripper mechanism for the writing element;

said tube being oriented within said casing so that the hook section of the first leg normally extends into the second slot when said gripper end section is in its retracted position whereby said hook section is then located between the projecting writing element and the remaining writing elements within the tube.

4,966,479

COSMETIC CONTAINER CONSTRUCTION

Eric J. Idec, Madison, and Edward F. Klimeck, Waterbury, both of Conn., assignors to Risdon Corporation, Naugatuck, Conn.

Filed Jan. 4, 1989, Ser. No. 293,208
Int. Cl.[5] A45D *40/04*
U.S. Cl. 401—68 **9 Claims**

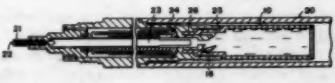
9. A cosmetic container, comprising a base member having a lower end with an enlarged external profile that is polygonal and having a tubular upper end in partially telescoping axially retained rotatable relations within one end of the bore of an outer tubular sleeve member, the remainder of the bore of said tubular sleeve member having a somewhat polygonal sectional profile that is reduced from but corresponds to the polygonal profile of said base member, a carrier cup slidable within said remainder of the bore of said tubular member and having a somewhat polygonal peripheral contour for non-rotational reference to said outer tubular member, said carrier cup having an externally threaded propulsion stem extending into and in threaded engagement with at least a part of the tubular upper end of said base member, said outer tubular sleeve member having an external profile that is polygonal and corresponds to and is reduced from the profile of said base member, said base member having a radially outward circumferentially extending shoulder formation confronting the adjacent axial end of said tubular sleeve member, and axially coacting detent formations on said shoulder and said adjacent axial end and providing compliantly yieldable detent action at each of a plurality of equal angular increments of relative rotation of said members, said plurality corresponding to the number of sides of said polygonal profile, the external profiles of said base member and of said sleeve member being in angular register at occurrence of coaction between detent formations.

4,966,480

WASHING LIQUID CARTRIDGE FOR REFILL INK TYPE WRITING INSTRUMENT

Hitosi Watanabe, Ageo; Ikuo Takagishi; Toshinobu Kosaka, both of Soka, and Katsuhiko Kawabata, Kasukabe, all of Japan, assignors to Pentel Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 17,073, Feb. 20, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 240,351
Claims priority, application Japan, Feb. 28, 1986, 61-28330[U]
Int. Cl.[5] B43K *13/00*
U.S. Cl. 401—134 **5 Claims**



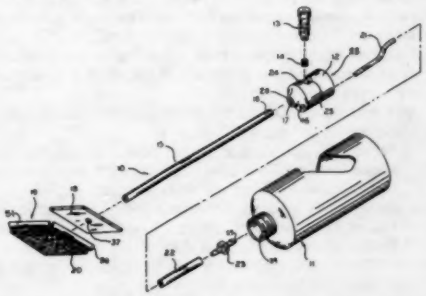
1. A washing liquid cartridge mountable in a hand-held writing instrument of the type having a writing tip, an ink passage connected at its one end to said writing tip and a removable ink container releasably connected to the other end of said ink passage, said ink container containing an ink having a resin as a component thereof, said washing liquid cartridge comprising: a cartridge body having a shape for fitting into the writing instrument in place of the ink container and containing therein a washing liquid for dissolving the resin in the ink, and an engagement portion on said cartridge body for releasably connecting to the other end of the ink passage, and an openable seal adjacent to said engagement portion openable by engagement with the other end of the ink passage, whereby when said washing liquid cartridge is snugly fitted in the writing instrument in place of the ink container to connect with the ink passage at said engagement portion, said seal of said washing liquid cartridge is opened and the writing instrument can be allowed to stand and the washing liquid in said cartridge will flow into the ink passage.

4,966,481

CLEANING FLUID DISPENSER AND APPLICATOR

Robert Satten, 100 Wilmot Rd., Deerfield, Ill. 60015, and Helmut Held, 1811 W. Summerdale, Chicago, Ill. 60640

Filed Jul. 27, 1988, Ser. No. 224,714
Int. Cl.[5] B67D *3/00*; A47L *25/00*
U.S. Cl. 401—205 **31 Claims**



1. A cleaning fluid dispenser and applicator apparatus, for use with a replaceable container having therewithin a fluid, such as a cleaning fluid, for the facilitated release and delivery

thereof from said container upon actuation of said apparatus, said apparatus comprising:

fluid conduit means for directing and providing a passageway for conveying said fluid away from said container, said fluid conduit means having oppositely arranged first and second ends;

flow regulation means operably associated with said first end of said fluid conduit means for the selective, manual, operator-actuated control of flow of said fluid from said container through said apparatus;

adapter means operably associated with said flow regulation means for operable attachment of said apparatus upon said container at a fluid release orifice thereof so as to define an interface between said fluid conduit means and said container;

said adapter means including sealing means for ensuring that said fluid is prevented from escaping through said interface between said fluid release orifice and said adapter means; and

applicator means operably arranged upon said second end of said fluid conduit means, at a position remote from said flow regulation means, for collecting and retaining said fluid and permitting said operator to apply said fluid upon a desired surface, while enabling said operator to maintain his or her hands substantially uncontaminated by said fluid.

4,966,482

SUBSTRATE SUPPORT OF INTEGRAL CONSTRUCTION

Nobuaki Fujimoto, Okazaki, Japan, assignor to Kitagawa Industries Company, Ltd., Nagoya, Japan

Continuation of Ser. No. 102,500, Sep. 29, 1987, abandoned, which is a continuation of Ser. No. 815,024, Dec. 31, 1985, Pat. No. 4,712,939. This application Nov. 3, 1989, Ser. No. 432,304

Claims priority, application Japan, Jan. 11, 1985, 60-2610

Int. Cl.[5] F16B *19/00*; H05K *7/12*

U.S. Cl. 403—24 **4 Claims**

1. A substrate support of integral construction by which a substrate containing a hole can be fixed angularly relative to a plate, said substrate support comprising:

(a) a base having a first planar surface and a second planar surface parallel to said first planar surface;

(b) a fixing portion extending from said first planar surface of said base for coupling said base to a plate;

(c) at least one first projection extending perpendicularly from said second planar surface of said base, said at least one first projection having:

(i) a first side surface perpendicular to said second planar surface of said base;

(ii) a second side surface perpendicular to said second planar surface of said base and parallel to said first side surface of said at least one first projected; and

(iii) a top surface perpendicular to said first side surface of said at least one first projection and parallel to said second planar surface of said base;

(d) a wall extending perpendicularly from said second planar surface of said base, said wall having:

(i) a first side surface perpendicular to said second planar surface of said base and parallel to said first side surface of said at least one first projection;

(ii) a second side surface perpendicular to said second planar surface of said base and parallel to said first side surface of said wall;

(iii) a top surface perpendicular to said first and second side surfaces of said wall and parallel to said second planar surface of said base;

(iv) a third surface joining said first and second side surfaces;

(v) a fourth side surface joining said first and second side surfaces; and

(vi) a recess in said second side surface of said wall, said recess having a first side surface adjacent to said base and a second side surface remote from said base; and

(e) a second projection extending from said second side surface of said wall toward said at least one first projection but leaving a space therebetween, said second projection having a sloping surface extending:

(i) from a line parallel to said second planar surface of said base, perpendicular to said first and second side surfaces of said wall, and between said first and second side surfaces of said recess

(ii) to a line parallel to said second planar surface of said base, perpendicular to said first and second side surfaces of said wall, and on the side of said second side surface of said recess remote from said base, wherein:

(f) said at least one first projection further comprises a sloping surface joining said second side surface of said at least one first projection and said top surface of said at least one first projection and

(g) said sloping surface of said at least one first projection is parallel to and spaced form said sloping surface of said second projection.

4,966,483

VALVE OPERATING MECHANISM

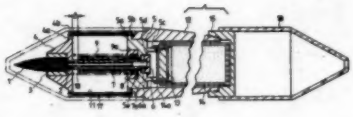
Yasuyuki Hashimoto, and Haruo Yamashita, both of Hyogo, Japan, assignors to Ancos Co., Ltd., Osaka, Japan

Filed Nov. 7, 1988, Ser. No. 267,952

Claims priority, application Japan, Nov. 12, 1987, 62-284367; Feb. 23, 1988, 63-21810[U]; Sep. 20, 1988, 63-233791

Int. Cl.[5] B43K *5/18, 8/04*

U.S. Cl. 401—206 **39 Claims**



1. A value operating mechanism, comprising:

an elongated hollow body comprising a pair of rigid longitudinally spaced sections;

a valve means provided within said body for controlling fluid flow through said body;

a longitudinally extending and substantially inextensible radially displaceable means provided on said body and interconnecting said sections;

biasing means disposed within said hollow body for continuously applying a biasing force in a direction which longitudinally separates said sections and closes said valve means, said radially displaceable means being coupled to said biasing means and said body sections such that said radially displaceable means is biased in an axial direction of said hollow body by the biasing force; and

means for opening said valve means in accordance with a radial displacement of said radially displaceable means in a radial direction with respect to said hollow body, the longitudinal distance between said body sections and the longitudinal length of said radially displaceable means being shortened when said radially displaceable means is radially displaced in said radial direction.

4,966,484

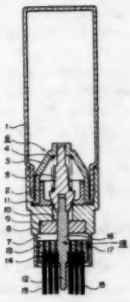
TOOL FOR APPLYING HAIR TONIC AND THE LIKE

Masaru Kimura, Gunma, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 165,314, Mar. 8, 1988, abandoned. This application Apr. 3, 1989, Ser. No. 332,387

Int. Cl.[5] A46B *11/00, 11/02*

U.S. Cl. 401—273 1 Claim



1. A hair tonic applying and patting tool which comprises:
(a) a hair tonic storage tank which may also function as a main body for the tool;
(b) a valve device secured to the front opening of the storage tank;
(c) a support member projecting into said main body having guide conduit holes opening at a rear surface of said member and brush bristles mounted in said support member at the front and thereof with their rear end in communication with said guide conduit holes and having a spindle slidably received in the front surface of said valve device;
(d) a temporary storage space between said valve device and said guide conduit holes, whereby pushing said bristles against the scalp of a user will cause flow of hair tonic to said bristles and will further open said valve device to allow hair tonic to flow to said temporary storage space;
said support member having a stem, projecting between said bristles to facilitate the patting of the hair tonic into the hair and scalp.

4,966,485

SLIDING CLAMP FOR A BINDER HAVING FLEXIBLE BINDING PRONGS

Alister Jack, Patrijs 32, 9843 GS Grijpskerk, Netherlands

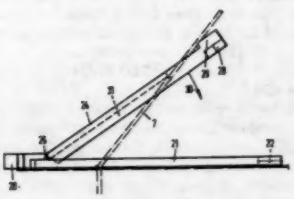
Filed Jul. 5, 1985, Ser. No. 752,028

Claims priority, application Netherlands, Dec. 31, 1982, 8205080

The portion of the term of this patent subsequent to Apr. 30, 2004, has been disclaimed.

Int. Cl.[5] B42F *13/10, 13/38*

U.S. Cl. 402—16 7 Claims



1. A sliding clamp for fastening a binding prong of a binder having flexible binding prongs, which is adapted to slide in a rail shaped member of substantially C-shaped cross-section, which is fitted with openings for the passage of the binding prongs, characterized in that the sliding clamp comprises a first elongate portion adapted to slide in the rail-shaped member and which is provided with a passage for a binding prong; and a second portion pivotally connected to the first portion and forming an extension of said first portion, said second portion being adapted for pivotal movement in a pivoting line extending transversely to the longitudinal direction of the first portion, and having cam means for being selectively locked in a position within said rail shaped member wherein the binding prong is bent and clamped.

4,966,486

BINDER ASSEMBLY

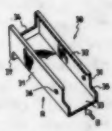
Satoshi Mizutani, and Hiroaki Nakada, both of Tokyo, Japan, assignors to King Jim Co., Inc., Tokyo, Japan

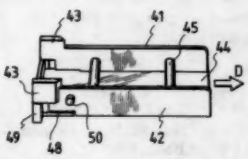
Filed Aug. 3, 1989, Ser. No. 388,865

Claims priority, application Japan, Aug. 9, 1988, 63-105051[U]

Int. Cl.[5] B42F *13/34*

U.S. Cl. 402—68 5 Claims





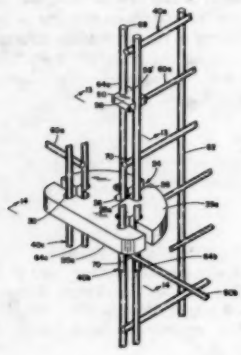
1. A binder assembly comprising a binder cover and a binder body each made of a relatively hard plastic with a low elasticity for detachable coupling to a shefback of a file, wherein:
(a) the binder cover comprises a bottom plate, right and left side plates extending from said bottom plate, and an end plate extending from said bottom plate and connecting said right and left side plates, wherein said side plates have a recess at an open end of the binder cover;
(b) the binder body comprises a central bottom plate, and right and left turnable side plates being pivotably connected through hinges to said central bottom plate, wherein said turnable side plates include binding pipes and binding rods such that said binding pipes and binding rods mutually cooperate when said binder body is in a closed position to form sheet retainers, and wherein said turnable side plates include clamps at one end thereof; and
(c) said end plate of said binder cover has a protrusion projecting from an outer side of the binder cover, and said central bottom plate of said binder body has an end protrusion projecting from an outer side of the binder body in the vicinity of said clamps.

4,966,487

CONNECTING DEVICES FOR GRIDS

Howard L. Sinkoff, 244 Jennings Ave., Patchogue, N.Y. 11772

Filed Mar. 16, 1990, Ser. No. 494,756
Int. Cl.[5] F16D *1/00*
U.S. Cl. 403—24 8 Claims



1. A connector for joining in a horizontal angular array at least two vertical rectangular grids, each of said grids having horizontal rods connected and disposed between two spaced pairs of vertical spaced end rails and a plurality of spaced vertical rails each connected to said horizontal rods and spaced between said pairs of end rails, comprising;

a flat rigid plate having spaced end edges with a symmetrical notch formed in each of said edges,

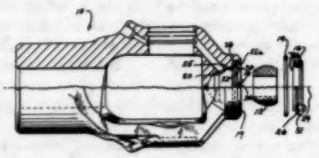
each of said notches having a passage extending inwardly from one of said edges and terminating at two laterally spaced opposing concave lobes, the spacing of said lobes being substantially equal to that of said end rails to snugly and slidably engage said rails, and a third concave lobe being located to pass said rods when said plate slides vertically along said rails.

4,966,488

BALL RETAINER

Roger D. Mayhew, Fredonia, Wis., assignor to Weasler Engineering, Inc., West Bend, Wis.

Continuation of Ser. No. 98,151, Sep. 18, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 385,942
Int. Cl.[5] F16D *3/26*; F16B *21/00*
U.S. Cl. 403—135 9 Claims



1. A ball retainer for the centering apparatus of a universal joint for a rotary drive line, comprising:

a yoke having a ball receiving cavity at one end thereof;

a first spherical surface formed in said ball receiving cavity, said spherical surface defining an axial direction and a radial direction in a plane normal to the axial direction and opening in its substantially largest dimension in the radial direction outwardly away from said yoke;

a ball for being retained in said cavity and slidably mating with the first spherical surface;

a ball retainer ring for keeping the ball in the cavity, said retainer ring having an inner end and an outer end;

a second spherical surface on the ball retainer ring for mating with the ball when the ball is mating with the first spherical surface, said second spherical surface opening in its substantially largest dimension in the radial direction toward said yoke, said outer end of the ball retainer ring intersecting said second spherical surface at said substantially largest dimension in the radial direction of said second spherical surface; and

a circular retainer spring for locking the retainer ring to the yoke;

the ball receiving cavity having at one end an enlarged circular opening coaxial with the first spherical surface, said opening being defined by a first shoulder facing outwardly in the axial direction and having a radially inward edge and a radially outward edge, said radially inward edge intersecting the first spherical surface at said substantially largest dimension in the radial direction of said first spherical surface and said radially outward edge intersecting a cylindrical surface for engaging the outer periphery of the ball retainer ring with a clearance, said cylindrical surface having a groove formed therein which defines a second shoulder facing in the axial direction toward the first spherical surface;

the ball retainer ring having a groove around its outside circumference to receive the retainer spring, said groove having a side facing in the axial direction toward the first spherical surface, said ball retainer ring being insertable into said circular opening with said side of said groove passing beyond the axial position of the second shoulder of the circular opening and said groove allowing the retainer spring to be substantially fully compressed into said groove;

wherein the retainer spring is compressed into the groove in the retainer ring to insert the retainer ring into the circular opening, and expands behind the second shoulder after the retainer ring is inserted past the position where the side of the groove is aligned with the second shoulder of the ball receiving cavity when said retainer spring clears said shoulder so that the retainer ring locks the ball in the ball receiving cavity between the first and second spherical surfaces with a space between the first shoulder and the inner end of the ball retainer ring, a loose sliding fit between the ball and the ball receiving cavity and with the retainer ring freely rotatable in the circular opening.

4,966,489

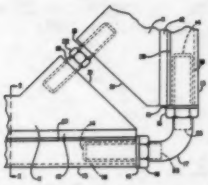
MANHOLE COVER SUPPORT HAVING INTERBRACED TOP MEMBERS

Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Continuation-in-part of Ser. No. 201,573, Jun. 1, 1988, Pat. No. 4,867,600, and Ser. No. 323,622, Mar. 14, 1989, abandoned, and Ser. No. 207,185, Jun. 15, 1988, Pat. No. 4,872,780, and Ser. No. 207,266, Jun. 15, 1988, Pat. No. 4,867,601, and Ser. No. 207,326, Jun. 15, 1988, abandoned, and Ser. No. 207,325, Jun. 15, 1988, abandoned, and Ser. No. 76,668, Jul. 23, 1987, Pat. No. 4,834,574. This application Jun. 6, 1989, Ser. No. 362,216
The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.
Int. Cl.[5] E02D *29/14*
U.S. Cl. 404—26 27 Claims

1. A manhole cover support for raising the effective grade of an existing manhole cover receiving structure, the support having a metal body comprising a base portion, a seat portion thereabove for seating the manhole cover, the seat portion directed inwardly, a cover keeper portion that rises from the outer periphery of the seat portion and has at least a pair of opposing ends that define a gap between them, a bridging piece for spanning each said gap, the bridging piece having at least one free end, a receiver for slidably retaining each free end of

each bridging piece, the receiver being attached to and protruding outwardly from the keeper portion near the top thereof, the bridging piece including means for exerting pressure against the receivers that retain it.

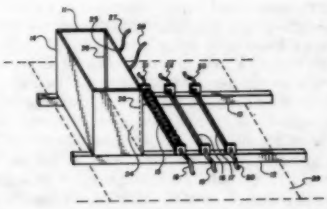


4,966,490

APPARATUS FOR USE IN APPLYING A THIN RESINOUS COATING TO EXISTING SURFACES

James V. Hodson, 1650 E. 500 South, Fruit Heights, Utah 84037

Filed Nov. 13, 1989, Ser. No. 436,809
Int. Cl.[5] E01C *19/22, 19/41, 19/48*
U.S. Cl. 404—103 **7 Claims**



1. An apparatus for use in applying a thin resinous coating to existing surfaces to resurface and restore the same comprising in combination, two parallel supporting beams adapted to being placed on the surface to be treated and being pulled along on top of the existing surface a screed box having a bottom, two sides and a front and back side, the bottom of which is fixedly attached to both of the parallel beams and the screed box having an adjustable dispensing gate on the back adapted to dispensing on the existing surface a controlled amount of the resinous binder, at least one rotatable screed brush attached between the two beams at a distance behind the screed box and being adapted to bringing the resinous binder in contact with the entire surface and pushing out any air that may otherwise be trapped under the coating, at least two spaced levelling bars attached between the two beams behind the screed brush and being adapted to spreading and levelling the resinous binder passing under the brush, at least one of the levelling bars being adapted to applying downward pressure on the layer of resinous binder passing under the bar and thus effecting a firm bond between the thin resinous binder coating and the surface to be treated.

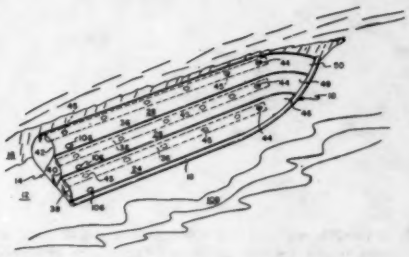
4,966,491

SUBSURFACE DUNE PROTECTION SYSTEM AND METHOD

Jay W. Sample, 2119 Longview Dr., Tallahassee, Fla. 32303

Filed Aug. 1, 1989, Ser. No. 388,084
Int. Cl.[5] E02B *3/04*
U.S. Cl. 405—19 **16 Claims**

1. A subsurface dune protection system comprising a generally wedge-shaped single inflatable container capable of being deployed on a dune surface being protected in a deflated condition; said container being substantially right triangular in cross-section with a generally horizontal base wall, a generally vertical back wall positioned adjacent a dune escarpment, and an upper sloped wave impacting wall sloping downwardly seaward connecting with said base surface at the wedge cutting edge; internal divider walls separating said single container into a plurality of separate cells extending parallel to one another and parallel to the adjacent shoreline; said container and said cells extending a substantial distance along the shoreline; a first of said cells being positioned at the wedge cutting edge and defining a first portion of said sloping wall; each additional said cells increasing in height defining higher portions of said sloping wall as they progress landward; and a toe scour tube attached to the cutting edge and extending parallel the full length of said container; said toe scour tube preventing wave undercutting of said wedge cutting edge; said cell sloping walls being convex curved when said cells are inflated by filling with wet sand.

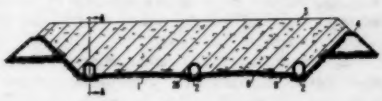


4,966,492

FLEXIBLE SEALING SHEET

Frank Poyda, Erftstadt, Fed. Rep. of Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Continuation of Ser. No. 101,434, Sep. 28, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,076
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1986, 3632951; May 2, 1987, 87106340
Int. Cl.[5] E02D *31/00*
U.S. Cl. 405—128 **16 Claims**



1. A flexible sealing sheet for controllable leakproof separation of regions present on both sides of the sheet, characterized in that the sealing sheet exhibits, in at least one plane, a plurality of hollow tubular channels extending essentially in the longitudinal extension of the sheet and being separated from one another by channel walls and in that the sealing sheet exhibits on both sides an impervious layer devoid of hollow spaces.

4,966,493

PROCESS AND APPARATUS FOR CLEANING CONTAMINATED SOIL

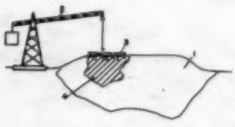
Dieter Rebhan, Geretsried-Gelting, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Oct. 4, 1989, Ser. No. 417,101

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1988, 3833796

Int. Cl.[5] B09B *1/00*; E02D *19/14*

U.S. Cl. 405—128 10 Claims



1. A process for cleaning earth contaminated with toxic pollutants which may be in buried containers, the process comprising placing at least one freezer box on the surface only of the contaminated earth to be cleaned so as to avoid disturbing and/or releasing any buried pollutants into the surrounding earth or groundwater, introducing a cold refrigerant into the freezer box until the earth below the freezer box is frozen to a desired depth, and removing at least a portion of the frozen contaminated earth, and avoiding disturbing unfrozen contaminated earth which could release toxic pollutants into surrounding soil and the atmosphere.

4,966,494

LOW LOAD PIPE FOR PIPE JACKING

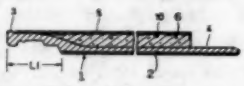
Hiroyoshi Inagaski; Masataka Fukami, and Kenji Kondo, all of Osaka, Japan, assignors to Kurimoto Ltd., Osaka, Japan

Filed Nov. 28, 1988, Ser. No. 276,457

Claims priority, application Japan, Dec. 9, 1987, 62-187305[U]

Int. Cl.[5] F16L *1/00*

U.S. Cl. 405—184 6 Claims



1. A low load pipe for pipe jacking, comprising:

a pipe body having an internal diameter and an external diameter, said pipe body including a socket section with a projecting annular rib at an external edge of the socket defining an external diameter, and a spigot section with an outer periphery;

said socket section having an internal diameter and an external diameter larger than the external diameter of said pipe body, and said spigot section having a length slightly longer than the length of the socket section; and

an outer pipe having a smooth external surface and an external diameter almost equal to the external diameter of said projecting annular rib, and a plurality of projecting outer rails projecting from its internal diameter,

said pipe body, with said socket section and said spigot section, defining a gap with said outer pipe which is filled with a filler material which adheres to said projecting rails, said filler material being retained in said gap.

4,966,495

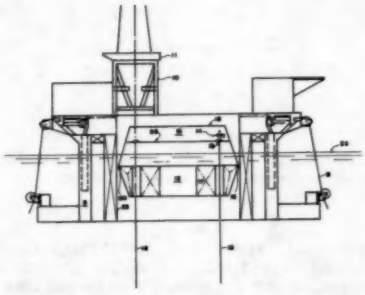
SEMISUBMERSIBLE VESSEL WITH CAPTURED CONSTANT TENSION BUOY

Jerome L. Goldman, 935 Gravier St., Suite 2100, New Orleans, La. 70112

Filed Jul. 19, 1988, Ser. No. 221,422

Int. Cl.[5] B63B *35/44*

U.S. Cl. 405—224 23 Claims



1. A semisubmersible vessel, comprising:

a buoyant caisson having a central well extending vertically therethrough; and

a constant tension buoy captured inside said central well in the absence of rigid attachment of the buoy to caisson, said constant tension buoy being held in a fixed position relative to a floor of a body of water, wherein said caisson and said buoy are independently floating bodies during operation, said buoy having a diameter at least slightly smaller than a diameter of the central well and is shaped to accommodate an angular roll and pitch motion of the caisson, while preventing such motion from affecting the motions of the buoy, and wherein said buoy has an upper frustoconically-shaped portion and lower frustoconically-shaped portion, the upper and lower portions being connected to each other adjacent their respective bases, so that the buoy tapers upwardly and downwardly from a widest point.

4,966,496

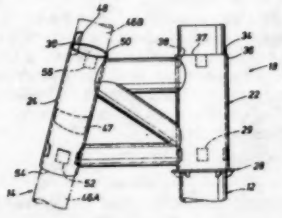
METHOD OF ERECTING OFFSHORE PLATFORMS

Clarence F. Stelzer, Jr., Houston, Tex., assignor to O. C. S. Operators, Inc., Baytown, Tex.

Filed Sep. 8, 1989, Ser. No. 404,678

Int. Cl.[5] E02B *17/06*

U.S. Cl. 405—227 7 Claims



1. A method of erecting a minimal structure offshore platform using a well caisson extending out of the water as a support member comprising the steps of:

(a) welding a stop ring onto a caisson extending above the waterline at a point above the waterline;

(b) lowering a template having first and second sleeves for receiving piles therethrough and a third sleeve for receiving the caisson therethrough over the caisson until the template rests upon the stop ring;
(c) welding the third sleeve to the stop ring and the caisson;
(d) lowering a first pile section through the first sleeve of the template;
(e) using a shim mounted on the high point of the first sleeve to align the first pile section and the first sleeve;
(f) aligning and welding additional pile sections to the first pile section lowered through the first sleeve until the pile has been driven to grade;
(g) welding the driven pile to the first sleeve;
(h) repeating steps (d)–(g) for the second sleeve; and
(i) supporting a deck with the template having the piles welded thereto.

4,966,497

METHOD OF SETTING, RESETTING AND PROTECTING POLES IN THE GROUND WITH FOAM POLYURETHANE RESINS

Norman R. Kirby, Alvin, Tex., assignor to Utility Structural Systems, Houston, Tex.

Filed Aug. 30, 1989, Ser. No. 400,645
Int. Cl.[5] E02D *5/26*
U.S. Cl. 405—232 **3 Claims**

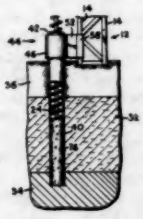
1. In the method of setting poles, resetting poles, ground line treatment of poles, encapsulation of pole treatment chemicals or the like with a foamed polyurethane composition wherein the improvement comprises the steps of in-situ formation of said composition by combining polyisocyanate, an organic active hydrogen containing component, a liquid water-immersible component in an amount effective to allow formation of a foam of sufficient strength for holding the pole in the presence of water, a catalyst and a non-ionic surfactant, said composition having a density of about 4–5 pounds per cubic feet and a compression of at least about 75 PSI.

4,966,498

PILE-FORMING APPARATUS FOR USE IN LOW DENSITY OVERBURDEN

Kenneth J. Blum, Kansas City, Mo., assignor to Berkel & Company Contractors, Inc., Bonner Springs, Kans.

Filed Aug. 16, 1989, Ser. No. 394,552
Int. Cl.[5] E02D *7/24, 5/34*
U.S. Cl. 405—233 **9 Claims**



5. Apparatus for securing a pile casing having a longitudinal axis and a sidewall in the earth during pile-forming operations, said casing presenting a protruding upper end, said apparatus comprising:
collar means for gripping said casing below said upper protruding end, thereof, there being means operatively coupled with said collar means for causing the collar means to exert a compressive force on said sidewall of said casing transverse to the longitudinal axis of said casing; and
means operatively coupled with said collar means for holding said collar substantially stationary and preventing substantial vertical movement of said collar means during gripping of siad casing.

9. In a method of forming an auger pressure grouted pile through the use of a tubular casing having a longitudinal axis and a sidewall embedded in the earth and presenting a protruding upper end, said method including the steps of shifting a flighted auger downwardly into and along the length of said casing while rotating the auger, and thereafter withdrawing the auger and filling the casing with grout to form a pile, the improvement which comprises securing said casing against substantial movement or vertical uprooting thereof during pile-forming operations, said casing-securing step comprising the step of gripping said casing below the upper protruding end thereof during movement of said auger therein, and, exerting a compressive force on said sidewall of said casing below the upper end of the casing and transverse to the longitudinal axis of said casing.

4,966,499

VIBRATORY COMPACTOR

Paul T. St. Louis, Littleton, Colo., assignor to FM Industries, Inc., Fort Worth, Tex.

Filed Dec. 26, 1989, Ser. No. 456,341
Int. Cl.[5] E02D *3/02*; E01C *19/34*
U.S. Cl. 405—271 **17 Claims**

1. A vibrating plate compactor adapted for connection to and use with a loading boom in the compaction of uneven materials, such as trash, said compactor comprising:
a compactor base plate for engaging the trash;
at least one inboard bearing member connected to and extending generally perpendicularly from said plate;
vibratory means for introducing vibrations into said base plate mounted on said inboard bearing member;
outboard bearing members connected to said base plate adjacent to the periphery thereof, each having a surface extending generally parallel to said inboard bearing member;
spaced connecting members having bearing portions located between said inboard and outboard bearing members and arranged for connection to the loading boom; and
a load carrying, vibration isolating member connecting each said outboard bearing member to the adjacent bearing portions of said connecting members and connecting each said connecting member to adjacent ones of said inboard bearing members.

4,966,500

FACE MILLING CUTTER WITH CUTTER INSERTS

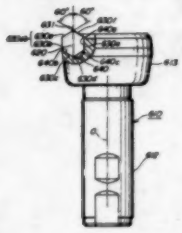
Osamu Tsujimura, Kawasaki; Tatsuo Arai, Kitamoto, and Takayoshi Saito, Shinagawa, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,149

Claims priority, application Japan, Sep. 16, 1987, 62-231712; Sep. 30, 1987, 62-149571[U]; Feb. 17, 1988, 63-19824[U]; Mar. 3, 1988, 63-28392[U]; Mar. 3, 1988, 63-28394[U]; Mar. 3, 1988, 63-28395[U]; Mar. 3, 1988, 63-28393[U]

Int. Cl.[5] B23C *5/20*

U.S. Cl. 407—34 24 Claims



15. A face milling cutter comprising:

a cutter body of a generally circular cross-section having an axis of rotation therethrough; and

a plurality of indexable cutter inserts releaseably mounted on an outer periphery of a forward end portion of said cutter body in circumferentially spaced relation to each other,

each of said inserts being of a hexagonal shape and being defined by opposite first and second faces and a peripheral surface disposed therebetween, said first face having six ridge lines defining six cutting edges, each of said inserts being positive such that said first face intersects said peripheral surface at an acute angle;

two adjacent cutting edges of said six cutting edges face generally radially outward to serve as major cutting edges while a cutting edge disposed adjacent to said major cutting edges faces generally radially inward and forward with respect to said body to serve as an inner cutting edge.

4,966,501

COATED CEMENTED CARBIDE TOOL

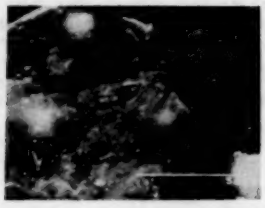
Toshio Nomura, and Masuo Chudo, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 7, 1988, Ser. No. 216,523

Claims priority, application Japan, Jul. 10, 1987, 62-173689

Int. Cl.[5] B23P *15/28*

U.S. Cl. 407—119 5 Claims



1. A cutting tool comprising a substrate of sintered hard alloy and a coating film provided thereon consisting of one or more layers of 2 to 20 μm in thickness, each consisting of a compound with a higher hardness than the substrate, in which at least surface of the coating film, on and near the ridgeline of cutting tip, of the surface of the tool is polished after coating and is substantially composed of a smooth surface with a surface roughness Rmax of at most 0.2 μm to the standard length of 5 μm.

4,966,502

HOLLOW DRILLING TOOL

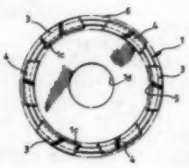
Eugen Magyari, Gams, Switzerland, assignor to Hilti Aktiengesellschaft, Fürstentum Liechtenstein, Liechtenstein

Filed Jul. 20, 1989, Ser. No. 383,367

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824502

Int. Cl.[5] B23B *51/04*

U.S. Cl. 408—59 2 Claims



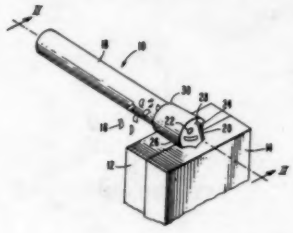
1. Hollow drilling tool comprising an axially extending tubular support (1) having a leading end (1*a*) in the drilling direction and an opposite trailing end (1*b*), said tubular support having a radially inner surface and a radially outer surface, wherein the improvement comprises a plurality of cutting members (3, 4) secured in a fixed manner to said support at the leading end thereof and disposed in circumferentially spaced relation, said cutting members extend in the axial and circumferential direction of said tubular support and extend from the leading end toward and spaced from the trailing end of said tubular support, each said cutting member has a radially inner surface and a radially outer surface relative to the axis of said tubular support, a number of first said cutting members (3) having the outer surface thereof projecting radially outwardly from the outer surface of said tubular support (1), a number of second said cutting members (4) having the inner surfaces thereof projecting radially inwardly from the inner surface of said tubular support, the outer surface of said first cutting members (3) project radially outwardly beyond the radially outer surfaces of said second cutting members (4) and the radially inner surfaces of said second cutting members (4) project inwardly from the radially inner surface of said first cutting members (3), said first and second cutting members (3, 4) project alternatively radially outwardly from, and radially inwardly from, the corresponding surfaces of the tubular support and are arrange around the circumference of said tubular support (1) at the leading end (1*a*) thereof, all of said first cutting members (3) projecting radially outwardly from the outer surface of the tubular support (1) are arranged on the same radius relative to the axis of said tubular support, all of said second cutting members (4) project radially inwardly from the inner surface of said tubular support (1) are arranged on the same radius relative to the axis of said tubular support, said first and second cutting members (3, 4) are approximately of the same dimensional size and project radially from the outer or inner surface of said tubular support (1) by substantially the same dimension A for the axial and circumferential directions thereof, a borehole (1*a*) at said trailing end of said tubular support for introducing cooling water to the interior of said tubular support and partly annular gaps (5, 6) of substantially the same size extending in the axial and circumferential directions of said tubular support defined between adjacent said first cutting members and the outer surface of said tubular support and between adjacent said second cutting member and the inner surface of said tubular support.

4,966,503

DRILL BIT FOR DRILLING A HOLE IN LAYERED MATERIAL OF DIFFERENT HARDNESS

Jerry W. Davidson, Valley Center, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed May 30, 1989, Ser. No. 358,128
Int. Cl.[5] B23B *51/06*
U.S. Cl. 408—59 7 Claims



1. A drill bit for drilling a hole in layered material wherein the first layer encountered by said bit is softer material than the second layer and wherein the second layer when encountered by said bit produced chips capable of abrading the first layer, said bit comprising:

a solid shaft having a cutting tip at one axial end thereof, said shaft having an axially-extending internal bore for conducting flushing fluid to said tip and an axially-extending flute in the outer surface of said shaft for conveying said fluid and said chips away from said tip; and

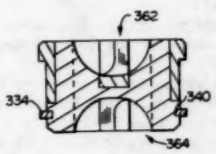
a tubular collar fixed to the outer surface of said shaft, said collar having a first end proximate said tip and an opposed second end spaced from said first end a predetermined axial length, said cutting tip axially projecting from said first end of said collar and having a diameter generally equal to the diameter of said collar at said first end thereof.

4,966,504

ELECTRODE TIP DRESSER AND HOLDER ASSEMBLY

Joseph P. Seme, Jr., Hudson; Charles R. Balog, Litchfield, and Robert Janashak, Garfield Heights, all of Ohio, assignors to Sem-Torq, Inc., Bedford, Ohio

Filed Nov. 30, 1988, Ser. No. 278,249
Int. Cl.[5] B23C *3/12, 5/14*
U.S. Cl. 409—140 10 Claims



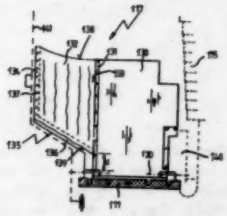
1. An electrode tip dresser comprising a pair of interlocking cutter blades, a rotatable holder for securing said blades, and a clamping means for releasably securing both said blades and said rotatable holdler, said blades having opposed ends and each of said blades having a cutting edge on one of the ends and a burnishing edge on the other end.

4,966,505

MACHINE TOOL

Hans-Henning Winkler, Tuttlingen; Eugen Rütschle, Mühlheim, and Rudolf Haninger, Seitingen, all of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH & Co. KG, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 906,323, Sep. 11, 1986, Pat. No. 4,768,902. This application Aug. 25, 1988, Ser. No. 237,725
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533089; Feb. 25, 1988, 3805844
Int. Cl.[5] B23Q *11/08*
U.S. Cl. 409—134 11 Claims



1. A machine tool comprising:

a spindle stock;

a worktable having an upper surface thereon, said worktable and said spindle stock being alternatively displaceable relative to each other in a plane parallel to said upper surface from a first position at which a first portion of said upper surface is disposed proximate said spindle stock and serves as a processing area and a second portion of said upper surface is disposed distal to said spindle stock and serves as a mounting area, to a second position at which said upper surface second portion is disposed proximate said spindle stock and serves as a processing area and said upper surface first portion is disposed distal to said spindle stock and serves as a mounting area;

splash guard means for separating said processing and mounting areas;

hinge means defining a first pivot axis and mounting said splash guard means to said table upper surface for enabling said splash guard (means) to be folded about said first pivot axis relative to said upper surface in order that a first working space above said processing area remains larger than a second working space above said mounting area when either said first or said second portion of said upper surface is proximate said spindle stock, and

dog means for folding said splash guard means, said dog means being attached to said spindle stock and contacting a folding mechanism of said splash guard means when said worktable and said spindle stock are displaced relative to each other in a direction parallel to a longitudinal axis of said worktable.

4,966,506

WELDING TIP DRESSER

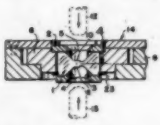
Daniel W. Slanker, Huber Heights, Ohio, assignor to Stillwater Technologies, Inc., Troy, Ohio

Filed Mar. 5, 1990, Ser. No. 487,843
Int. Cl.[5] B23C *3/12*
U.S. Cl. 409—140 6 Claims

1. In a dresser for shaping the product-contacting tip of a worn, elongated cylindrical electrode while it is mounted on an arm of a spot-welding machine to essentially restore a welding face of the tip to its physical condition prior to use and wear; said dresser comprising an elongated cutting tool, a holder for receiving and supporting said tool, and a motive means for unidirectionally rotating said holder and tool about a point on said face during dressing, said holder including a

central cylindrical opening for receiving a welding tip to be dressed and a pair of opposed slots across said opening for receiving the ends of said elongated tool in bridging fashion, the improvement comprising:

said tool having opposed sides one of which lies in a plane extending in the direction of receipt of an electrode and being located essentially on a crosswise centerline of said cylindrical opening,



said tool further having an edge essentially facing an electrode to be dressed, said edge and said one side being at an acute angle to form a sharp, raked cutting edge,

said cutting edge further extending from the inner surface of said opening to a point beyond the axis of said opening whereby rotation of the leading cutting edge of said tool into the tip dresses the tip of said electrode and restores its welding face to its original condition.

4,966,507

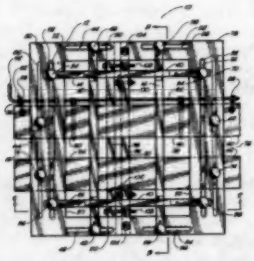
ROUTER JIG

Robert Hanks, 1925 Texas Ave., Bridge City, Tex. 77611

Filed Oct. 27, 1989, Ser. No. 427,778

Int. Cl.[5] B27C *5/10*

U.S. Cl. 409—175 **16 Claims**



1. A router jig comprising:

a baseplate having an open interior;

a first horizontal guide adjustably attached to said baseplate, said first horizontal guide extending across said open interior of said baseplate;

a first vertical guide adjustably attached to said baseplate, said first vertical guide extending across said open interior of said baseplate transverse to said first horizontal guide; said baseplate having a rectangular configuration, said baseplate being of a generally flat rigid material, said baseplate having a plurality of slots formed therein for receiving a portion of said first horizontal guide and said first vertical guide, said slots being countersunk on one side of said baseplate so as to allow the fixing of bolts within said countersunk slots; and

clamp means adjustably fastened to said baseplate for receiving a workpiece.

4,966,508

WORK HOLDING DEVICE FOR CUTTING PRINTED BOARDS

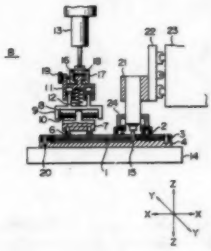
Tamio Otani, Hadano; Masao Nishigai, Ayase, and Yasuhiko Kanaya, Machida, all of Japan, assignors to Hitachi Seiko, Ltd., Tokyo, Japan

Filed Jun. 1, 1989, Ser. No. 360,132

Claims priority, application Japan, Jun. 3, 1988, 63-73358[U]; Dec. 2, 1988, 63-156599[U]

Int. Cl.[5] B23C *1/06*

U.S. Cl. 409—189 **1 Claim**



1. A work holding device used in an external form cutting machine for printed boards, said cutting machine including a work mounting table movable in X direction and a cutter mounting spindle movable in Y direction perpendicular to X direction, comprising,

holding means disposed above a work mounting table of an external form cutting machine for printed boards for holding printed boards on said table,

pushing means for pushing said holding means in a direction toward printed boards on the table,

elevating means for raising and lowering said holding means,

wherein said pushing means is interposed between said holding means and said elevating means and said pushing means includes, guide means for guiding said holding means for sliding movement in a horizontal direction relative to the guide means and positioning means for resiliently positioning the holding means in a predetermined position in the horizontal direction relative to the guide means, said pushing means pushing said holding means in a direction toward printed boards on the table by way of said guide means.

4,966,509

POWER BROACH SYSTEM

John A. Engelhardt, and Richard R. Tarr, both of Warsaw, Ind., assignors to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Oct. 2, 1989, Ser. No. 416,039

Int. Cl.[5] B23D *41/08*

U.S. Cl. 409—281 **17 Claims**

1. Apparatus for converting rotary motion to simultaneous reciprocating motion in at least two mutually transverse directions comprising:

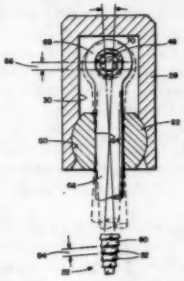
a transmission housing having an internal cavity;

an input shaft having a first longitudinal axis rotatably mounted about said first longitudinal axis on said transmission housing extending between a first end distant from said transmission housing adapted for releasable attachment to a driver and a second end received in the internal cavity, said second end including a driver cam having a second longitudinal axis parallel to and offset from said first longitudinal axis;

a spherical bearing member having a center of rotation and a diametrically extending bore therethrough, said bearing member being rotatably mounted about said center of

rotation on said transmission housing proximate to the internal cavity; and

an output shaft having a third longitudinal axis transverse to said first and second longitudinal axes slidably received in the diametrically extending bore extending between a distal working end and a proximal end within the internal



cavity having a transverse bore therein for rotatable reception of said driver cam member;

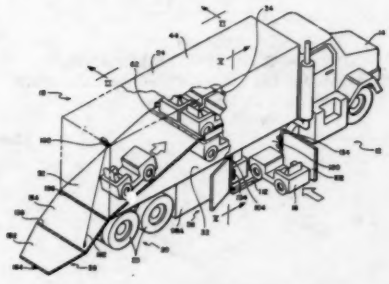
whereby rotation of said input shaft results in simultaneous reciprocating motion of said output shaft along the diametrically extending bore and reciprocating motion of said working end through an arc the center of which is said center of rotation of said spherical bearing.

4,966,510

TRAILER FOR TRANSPORTING GOLF CARTS AND THE LIKE

James N. Johnson, Jr., 112 Lakenheath La., Matthews, N.C. 28105

Filed Jun. 6, 1989, Ser. No. 362,705
Int. Cl.[5] B60D *3/07*
U.S. Cl. 410—26 18 Claims



1. In a vehicle for transporting golf carts and the like, the vehicle having a chassis, an apparatus for supporting golf carts and the like on the chassis during transport thereof, and comprising:

a substantially enclosed compartment mounted on the vehicle chassis, said substantially enclosed compartment including a pair of spaced apart, generally parallel wall means, each wall means having an upper and lower portion, said wall means upper portions supporting therebetween an overhead covering means, and floor means positioned between said pair of wall means and connected to said wall means lower portions, said wall means, said overhead covering means and said floor means defining the boundaries of the interior of said substantially enclosed compartment;

intermediate support means disposed interiorly of said substantially enclosed compartment, and including a first portion extending generally horizontally and being movable between a first support position intermediate said compartment overhead conveying means and said compartment floor means for supporting golf carts and the like thereon and a second storage position adjacent said overhead conveying means, and a second portion pivotally connected directly to said first portion, said second portion being movable between a first loading position extending upwardly from said floor means to said first portion, a second support position at which it is disposed in planar relation to said first portion at said first position therefor for supporting golf carts and the like therein, and a third storage position adjacent said overhead conveying means, said first and second portions together extending substantially across the full extent of said enclosed compartment when they are in said support positions thereof;

selectively operable load bearing means arranged for movement between a first disposition for supporting said second support means portion and said golf carats and the like carried therein when said second support means portion is at said second support position thereof, and a second disposition at which said load bearing means is clear of any said movement of said second support means portion between said first, second and third positions thereof; and

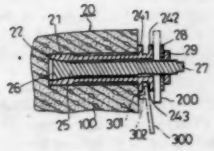
means for selectively moving said first support means portion between said first position and said second position thereof, and for moving said second support means portion between said first, second and third positions thereof.

4,966,511

EXPANSION BOLT UNIT FOR REPEATED USE

Yuan-Ho Lee, No. 851, Chung-San Rd., Nan-Pa. Tsun, Kuei-Jen Hsian, Tainan Hsieng, Taiwan

Filed Jun. 14, 1989, Ser. No. 365,692
Int. Cl.[5] F16B *13/06*
U.S. Cl. 411—55 6 Claims



1. An expansion bolt unit associated with a nut, said unit comprising:

an expansion tube adapted to be closely received within a bore in a surface of a rigid material and having a plurality of axially extending slits formed in an inner end portion thereof to define a plurality of jaw segments so as to constitute a chuck;

a bolt member including a frusto-conical section having a large-diameter end and a small-diameter end, and an externally threaded cylindrical section connected to said small-diameter end of said frusto-conical section, said expansion tube having an inner diameter which is smaller than said large-diameter end of said frusto-conical section so that said cylindrical section may be in turn inserted through said chuck and remaining portion of said expansion tube;

said nut being engagable with said cylindrical section and rotatable relative to said bolt member so as to expand said jaw segments of said expansion tube, thereby anchoring said unit in said rigid material; and

a pull device having two flanges extending radially and

outwardly from an outer end portion of said expansion tube which is outside of said rigid material, one of said flanges abutting against a surface of said rigid material, said flanges being spaced apart at a predetermined distance so that an end of said puller can be placed between said flanges.

4,966,512

INTERCONNECTING CONSTRUCTION BETWEEN MOUNTING PLATE AND BOLT

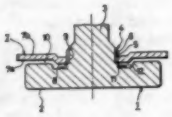
Hitoshi Takaku, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,743

Claims priority, application Japan, Dec. 15, 1987, 62-316718

Int. Cl.[5] F16B *37/04*

U.S. Cl. 411—181 **7 Claims**



1. An interconnecting construction between a mounting plate and a bolt in which a bolt shank is formed with a serration having several cusps at its one end, which serration is passed through an opening formed in a mounting plate, and an end face of a bolt head is disposed in abutment against one side of the mounting plate while the serration is subjected to a plastic deformation from the other side of the mounting plate, the mounting plate is held sandwiched between a portion of the bolt shank which passes through the opening and is subjected to the plastic deformation and the end face of the bolt head so as to secure the bolt to the mounting plate, with the serration biting into the mounting plate; characterized by a sealing, annular projection formed in the end face of the bolt head so as to surround the bolt shank, the annular projection and the serration being caused to bite into the mounting plate, and an annular recess formed in the end face of the bolt head, said annular projection being located in said annular recess.

4,966,513

INDOOR TYPE MECHANIZED STORAGE FACILITY

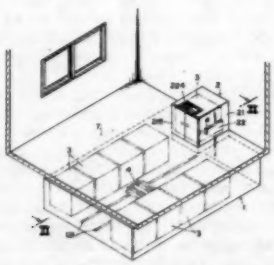
Kenro Motoda, Tokyo, Japan, assignor to Motoda Denshi Kogyo Kabushiki Kaisha, Kamikitazawa, Japan

Filed Mar. 21, 1989, Ser. No. 326,748

Claims priority, application Japan, Mar. 23, 1988, 63-69060

Int. Cl.[5] B65G *65/00*

U.S. Cl. 414—277 **11 Claims**



1. An indoor-type mechanized storage facility having a size which enables it to be moved from one place to another, which has an opening that opens into the interior of a building, comprising:

a box-shaped casing, an elevator device coupled to said casing a plurality of storage units accommodated in said casing, a conveying car that travels within said casing to convey said storage unit between said casing and said elevator device, and a control device for controlling the operation of said conveying car and said elevator device,

said casing being disposed in an empty space associated with said building and contains a plurality of storage portions which are aligned with each other and a passageway portion which is formed in front of said plurality of storage portions, said passageway being provided with rails on which said conveying car travels.

said storage unit having downwardly extending protrusions on the under surface thereof and a pair of protrusions on the two side surfaces thereof at the corresponding positions,

wherein said conveying car includes a travelling device that moves back and forth on said rails, and a transversely conveying device that conveys said storage unit substantially in the horizontal direction or to away from said storage portion, said transversely conveying device having a conveyor that moves back and forth in the direction in which said storage unit is transversely conveyed, and said conveyor having an engaging member that engages with said downwardly extending protrusion of said storage unit through a predetermined rotational angle and thereby draws or pushes said storage unit.

wherein said transversely conveying device is a wrapping connector driving device that employs a pair of chains, and wherein said engaging member extends between said chains, and

wherein said elevator device includes an elevator tower and a lift which is provided in said elevator tower in such a manner that it can rise and fall, the upper portion of said elevator tower having an opening and the lower portion of said elevator tower communicating with said passageway portion and said lift having supporting members which holds said protrusions provided on said side surfaces of said storage unit from below and lift said storage unit from said conveying car.

4,966,514

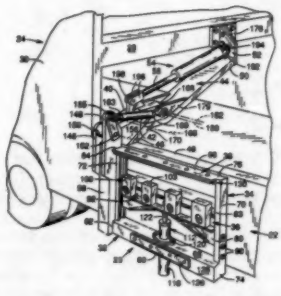
CONTAINER DUMPING MECHANISM

Johnn P. Knapp, 156 Las Colinas, Corralitos, Calif. 95076

Filed Apr. 20, 1989, Ser. No. 341,438

Int. Cl.[5] B65F *3/02*

U.S. Cl. 414—408 **13 Claims**



3. A mechanism for lifting a container that has a protruding member and for tilting the container over a hopper that extends from a refuse-holding compartment of a refuse collector, the hopper having an interior region and the refuse collector

having a transverse member located above and extending transversely of the interior region of the hopper, the mechanism comprising:

a rigid frame;

a clamp element mounted to the frame and actuatable for clamping the protruding member to the frame;

a support arm configured for attachment to the transverse member of the refuse collector at a point directly over or within the interior region of the hopper;

first and second links interconnected between the support arm and the frame to support the frame so that the frame is suspended near the hopper, one of the first and second links being pivotally mounted to the support arm at a pivot axis located medially of the transverse member and the frame to position the pivot axis directly over or within the interior region of the hopper; and

a lift actuator operatively connected to one of the first and second links for moving the frame between a load position and a dump position, wherein the clamped container is upright whenever the frame is in the load position and wherein the frame is tilted over the hopper whenever the frame is in the dump position.

4,966,515

LOAD HANDLING SYSTEM

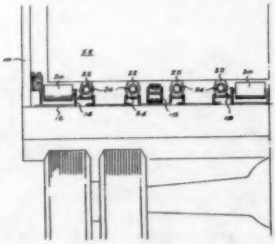
Daniel G. Van Niekerk, 2 Lynwood, Attwell Street, Denlee, Transvaal, South Africa

Filed Jul. 1, 1988, Ser. No. 214,432

Claims priority, application South Africa, Jul. 1, 1987, 87/4758

Int. Cl.[5] B60P *1/36*

U.S. Cl. 414—528 **12 Claims**



1. A load handling system comprising:

at least one guideway arranged to support and guide a load along a predetermined path; and

at least one pneumatically operated load support member disposed adjacent to the guideway which is movable between a retracted position in which said load support member allows the load to move freely along the guideway and an extended position in which said load support member is forced into contact with and provides substantially the sole means to immobilize the load;

wherein said load support member comprises an elongate resilient member containing a flexible pressure hose and having a load-bearing means defined thereon for direct frictional and deformable engagement with a bottom surface of said load and wherein said load bearing means comprises a load bearing surface which is resilient and deformable, wherein the load support member assumes the extended position when inflated and the retracted position when deflated.

4,966,516

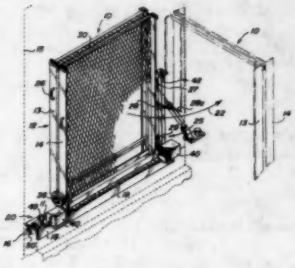
VEHICLE ACCESS RAMP HAVING ALTERNATIVE PIVOTS FOR STOWING

Roger Vartanian, East Stroudsburg, Pa., assignor to Vartanian Industries, Inc., Broadheadsville, Pa.

Filed Nov. 23, 1988, Ser. No. 275,276

Int. Cl.[5] B60P *1/44*

U.S. Cl. 414—537 **9 Claims**



1. A vehicle access ramp assembly comprising:

mounting means rigidly attachable in a vehicle openable doorway;

a ramp member movably fixed to said mounting means the ramp member being adapted to reside in the openable doorway of the vehicle inside a door operable to close said doorway, the ramp member including two ramp sections hinged at a knuckle, each said ramp section having a proximal end and a distal end and two side bars, said proximal end of said first ramp section being attachable to said mounting means, the distal end of said first ramp section being hingably attached to the proximal end of said second ramp section at the knuckle, at least one of said first and second ramp sections including attachment means engageable wit the mounting means for locking said ramp in a folded position along a lower edge of the doorway;

means for deploying said ramp member by rotation of the first and second ramp sections around said lower edge of the doorway to the ground on a horizontal hinge axis; and,

means for pivoting said ramp member, together with said means for deploying, around a vertical axis,

whereby, said ramp member pivots on the horizontal hinge axis for ramp deployment and alternatively swings on the vertical axis to clear the doorway for step-in access to the vehicle through the openable doorway.

4,966,517

APPARATUS FOR ROTATING A VEHICLE THROUGH NINETY DEGREES

Shearer E. Tune, 3237 Estes, Memphis, Tenn. 38115

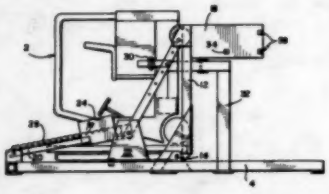
Filed Apr. 18, 1989, Ser. No. 340,021

Int. Cl.[5] B63C *3/00*

U.S. Cl. 414—678 **20 Claims**

1. Apparatus for rotating a vehicle from a horizontal position to a vertical position and for permitting repairs to said vehicle comprising base frame means for being placed on a floor, stop means for engaging an end of said vehicle, support means for engaging a bottom surface of said vehicle during rotation, lifting means for rotating said stop means and said support means about a substantially horizontal axis with respect to said frame means and for rotating said vehicle to a vertical orientation, and means for allowing said support

means to be moved away from and disengaged from said bottom surface while said vehicle is in said vertical orientation, for



exposing the bottom of the vehicle whereby the bottom of said vehicle is substantially unobstructed.

4,966,518

APPARATUS FOR CONTROLLING POSTURE OF FRONT LOADER

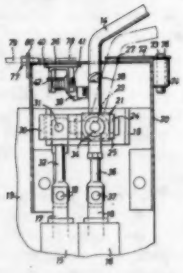
Isao Kourogi, and Masami Hirooka, both of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Aug. 10, 1988, Ser. No. 230,779

Claims priority, application Japan, Aug. 12, 1987, 62-202321; Aug. 12, 1987, 62-202326

Int. Cl.[5] E02F *3/00*

U.S. Cl. 414—700 **17 Claims**



1. A front loader comprising upwardly and downwardly pivotable booms attachable to a vehicle body and a work implement attached to forward ends of the booms and pivotally movable in a scooping direction and a dumping direction, each of the booms and the implement being pivotally movable by a single control lever independently of each other and also at the same time, and an apparatus for controlling the posture of the front loader, the apparatus comprising boom position detecting means for detecting whether each boom is positioned at or above a specified lever, implement position detecting means for detecting whether the work implement is positioned at least at a specified angle in the scooping direction relative to the boom, and actuating means for shifting the control lever from a boom-up position to a boom-up and implement-dumping position upon the boom position detecting means detecting the boom being positioned at or above the specified level and upon the implement position detecting means detecting the implement being positioned at or beyond the specified angle in the scooping direction relative to the boom, the boom position detecting means being operatively connected to the actuating means by a push-pull cable, the cable being operable in a direction to operate the actuating means when the boom is pivotally moved to the specified level or higher, the implement position detecting means being operatively connected to a pivotal arm, the push-pull cable including an outer wire axially movably supported by the pivotal arm and changeable by the movement of the pivotal arm to a state having axial play or alternatively to a state failing to have axial play, the pivotal arm being movable in a direction to eliminate the play of the outer wire upon the implement position detecting means detecting that the implement is positioned at least at the specified angle in the scooping direction relative to the boom.

4,966,519

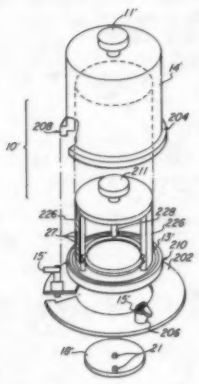
INTEGRATED CIRCUIT PROCESSING SYSTEM

Cecil J. Davis, Greenville; Robert Matthews, Plano, and Robert A. Bowling, Garland, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 61,017, Jun. 12, 1987, abandoned, which is a continuation of Ser. No. 824,342, Jan. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 790,708, Oct. 24, 1985, abandoned, Ser. No. 790,918, Oct. 24, 1985, abandoned, and Ser. No. 790,924, Oct. 24, 1985, Pat. No. 4,687,542. This application Oct. 29, 1987, Ser. No. 114,812

Int. Cl.[5] B65G *49/05*

U.S. Cl. 414—786 **46 Claims**



1. A method of fabricating integrated circuits, comprising the steps of:

performing desired process steps at plural respective process stations separated by an ambient at substantially atmospheric pressure; and

transporting partially fabricated integrated circuit wafers among said process stations to perform a predetermined sequence of processing steps on one of said wafers, said transporting step comprising the substep of:

transporting said wafers under vacuum in a vacuum-tight carrier after said wafers have been transferred to said carrier after the processing steps have been carried out.

4,966,520

METHOD OF POSITIONING OBJECTS TO BE MEASURED

Keiichi Yokota, Nirasaki, and Ryuichi Takebuchi, Yamanashi, both of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Nov. 1, 1989, Ser. No. 430,589

Claims priority, application Japan, Nov. 2, 1988, 63-278389

Int. Cl.[5] H01L *21/66*

U.S. Cl. 414—786 **10 Claims**

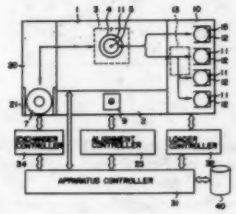
1. A method of positioning an object to be measured and suitable for use with an apparatus having a detecting means which is capable for detecting an image pattern of elements arranged on the object, and memory means for memorizing the image pattern and positional information of the elements, for measuring characteristics of each of the elements while con-

tacting probes with electrode pads of each of the elements, said method comprising

step of mounting the object to be measured on a table movable in a direction X and in a direction Y, which crosses the direction X at right angle, on a plane on which the elements are arranged on the object to be measured, and also rotatable on the plane;

step of aligning the elements-lined direction on the object with the directions X and Y in which the table can move;

a step of rotating the object with reference to an angular position, at which the elements-lined direction on the object is aligned with the directions X and Y, to align the elements-lined direction on the object with a previously-stored direction in which the measuring probes are arranged;



step of detecting the patterns of the plural elements on the object and recognizing and determining a probing direction in which the elements on the object are successively moved and contacted with the measuring probes;

a step of determining a reference position on the object using the probing direction and reference image pattern data previously stored;

a step of aligning the reference position with the measuring probes while moving the table in the directions X and Y; and

step of measuring the elements at their respective positions calculated from the reference position, while moving the table along the probing direction.

4,966,521

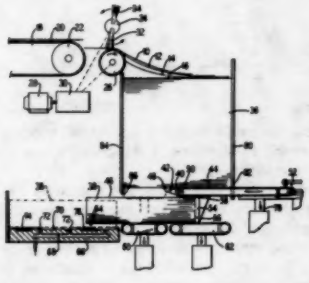
TAIL STOPPING AND KNOCKDOWN DEVICE

Kenneth G. Frye, South Egremont, Mass.; Donald C. Fitzpatrick, Chatham, N.Y., and Donald R. Grody, Pittsfield, Mass., assignors to Beloit Corporation, Beloit, Wis.

Continuation of Ser. No. 557,439, Dec. 2, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 888,083

Int. Cl.[5] B65G *60/00*

U.S. Cl. 414—788.8 **19 Claims**



1. An apparatus for slowing and collecting in stacks sheets delivered in seriatum flow from a sheet carrying surface of a high speed conveyor, said apparatus comprising:

a slowdown roll assembly for receiving the sheets from the high speed conveyor, including a continuously rotating roll and a drive means for rotating said roll at a substantially constant speed slower than the high speed conveyor system, said roll having a sheet engaging surface for advancing sheets nipped there against while allowing said roll to rotate freely beneath sheets resting unnipped thereon without advancing the resting sheets;

a combination tail knockdown and nipping means operating intermittently for depressing the tail ends of sheets leaving the high speed conveyor and for periodically forming a nip with said rotating roll for advancing sheets nipped to said continuously rotating roll, said knockdown and nipping means being controlled to allow the leading edge of a sheet to pass unrestricted over the depressed tail of a sheet immediately preceding it;

a collection unit adjacent said slowdown roll assembly including upstream and downstream walls defining a stack collecting area for receiving sheets advanced by said slowdown roll assembly directly from said slowdown roll assembly; and

ream removing means for automatically and continuously removing reams of sheets from the bottom of the pile formed in said collection unit, said removing means including a spear means for separating a ream from the pile, pusher means for urging a separated ream from the pile, movable support means for supporting the bottom of the stacking pile and conveyor means for transporting the separated ream to a distant point.

4,966,522

IN-TANK TYPE FUEL PUMP

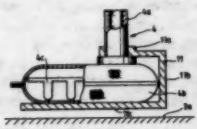
Masahiro Koyama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,447

Claims priority, application Japan, Nov. 18, 1987, 62-175911[U]

Int. Cl.[5] F04D *29/70*

U.S. Cl. 415—121.2 **4 Claims**



1. An in-tank type fuel pump installed in a fuel tank, comprising:

suction inlet means through which fuel is supplied from said fuel tank to said in-tank type pump;

strainer means coupled to said suction inlet means and having screen means for removing foreign matter from the fuel;

protection means provided on the bottom of said screen of said strainer for protecting said screen; and

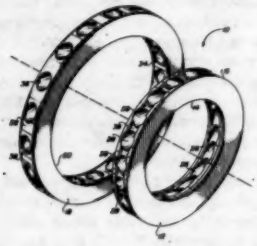
a coupling pipe for connecting said strainer with said suction inlet in which said protection means comprises an upper portion thereof coupled to said coupling pipe, a middle portion thereof, and a lower portion thereof which merges through said middle portion to said upper portion, said lower portion being in continuous contact with the entire bottom of said screen means.

4,966,523

TWO-ROW PIPE DIFFUSERS WITH BOUNDARY LAYER CONTROL

Sanjay V. Sherikar, Tempe, Ariz., assignor to Tiernay Turbines, Incorporated, Phoenix, Ariz.

Filed Jul. 27, 1989, Ser. No. 385,898
Int. Cl.[5] F04D 29/44
U.S. Cl. 415—208.4 4 Claims



1. A diffuser for use with a centrifugal compressor having a rotary impeller, said diffuser comprising:

(a) a first annular member having an inner circumference for closely surrounding the impeller, and an outer circumference opposite said inner circumference;

(b) a plurality of intersecting flow passages extending radially through said first annular member, each of said passages having an inlet opening for fluid communication with the impeller and an outlet opening along the outer circumference of said first annular member, wherein the cross-sectional area of each of said passages increases at a predetermined rate, from a minimum at said inlet opening to a maximum at said outlet opening;

(c) a second annular member having an inner circumference for closely surrounding the outer circumference of said first annular member, and an outer circumference opposite said inner circumference;

(d) a plurality of flow passages extending radially through said second annular member, each of said passages having an inlet opening aligned with an outlet opening in one of the passages through said first annular member and an outlet opening along the outer circumference of said second annular member, wherein the cross-sectional area of each of said passages increases at a predetermined rate from a minimum at said inlet opening to a maximum at said outlet opening, the cross-sectional area of said inlet opening being substantially equal to the cross-sectional area of the aligned outlet opening of said first annular member; and

(e) a circumferentially extending groove formed between said first annular member and said second annular member, said groove intersecting said radially extending passages to allow flow between adjacent passages and thus reduce blockage due to boundary layer build-up in the passages.

4,966,524

BLOWER

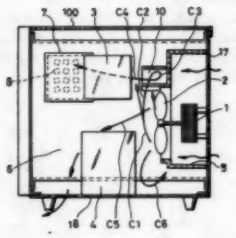
Tatsuaki Kodama, Yamatokouriyama, and Yoshiyuki Takada, Sakurai, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 207,633, Jun. 16, 1988, abandoned.
This application Mar. 15, 1990, Ser. No. 494,958
Claims priority, application Japan, Jun. 18, 1987, 62-151856; Jun. 26, 1987, 62-159999
Int. Cl.[5] F04D 29/44
U.S. Cl. 415—223 3 Claims

2. A blower comprising;

a propeller fan having blades rotatable about an axis and generating an air current having a first portion having a component blown generally parallel to said axis and a second portion having component blown generally radially outward of said axis into the peripheral area about said blades;

a partition plate surrounding said fan for partitioning the air sucking side and the air blowing side of said fan from each other;



air current receiving means on said partition plate on said air blowing side of said fan for receiving at least a part of the air second current portion; and

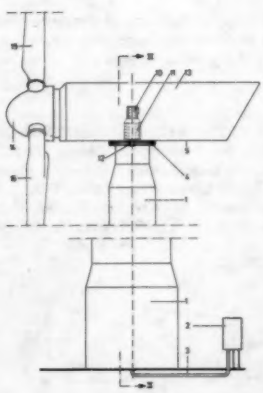
air guide means on said partition plate on said air blowing side of said fan for guiding the air current part received by said current receiving means and blowing the air out in a direction generally parallel to said axis.

4,966,525

YAWING DEVICE AND METHOD OF CONTROLLING IT

Erik Nielsen, Lindholmvej 28, 5250 Odense Sv, Denmark

Filed Feb. 1, 1988, Ser. No. 150,770
Int. Cl.[5] F03D 7/04
U.S. Cl. 416—9 5 Claims



1. A yawing device for rotating a windmill about a yawing axis, the windmill rotatable on a stationary tower base, said yawing device comprising:

a toothed rim fixedly attached to the stationary tower base;

at least two motors, each motor disposed separately about the periphery of the toothed rim,

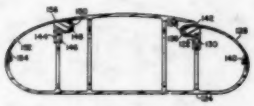
a driving wheel rotatably mounted to each gear motor, the driving wheels engaged with the toothed rim, each gear motor having a torque capacity which is applicable in an equal and opposite direction and amount to the torque applicable by the other gear motor such that the windmill is held in an operating position.

4,966,526

MECHANICALLY ACTUATED SLOT FOR CIRCULATION CONTROL ROTOR

Armand F. Amelio, Yonkers, N.Y., and William C. Fischer, Jr., Monroe, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 13, 1989, Ser. No. 379,305
Int. Cl.[5] B64C 21/04
U.S. Cl. 416—90 R 1 Claim



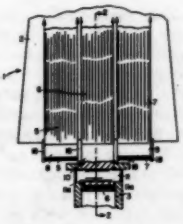
1. An aircraft utilizing a circulation control rotor system having a rotor drive shaft with rotor blades connected thereto, a rotor control system and a pneumatic system for supplying compressed air to said rotor blades including air storage means surrounding said rotor drive shaft means, said air storage means including a non-rotating chamber for receiving compressed air and a chamber rotating with said rotor drive shaft and rotor blades and from which compressed air is delivered to said rotor blades, each of said rotor blades including a variable slot along at least one edge of said blade, said slot consisting of a fixed surface and a flexible panel surface, track means extending longitudinally within said blade adjacent said flexible panel surface, driver means mounted on and slideable along said track means, means located in the root of said blade for imparting reciprocal sliding motion to said driver means in response to rotor control system inputs, connecting camming means between said track means and said driver means to cause said driver means to change elevation with respect to said track means during sliding motion, said flexible panel surface being slideably connected directly to said driver means so that changes in elevation of said driver means is imparted directly to said flexible panel surface to change slot area.

4,966,527

COMPOSITE BLADE CONSTRUCTION FOR A PROPELLER OR ROTOR BLADE

Herbert Merz, Munich, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 389,333
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826378
Int. Cl.[5] F01D 5/14, 5/30
U.S. Cl. 416—241 R 21 Claims



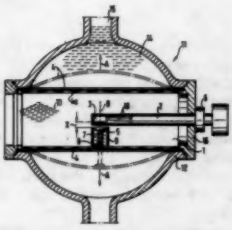
1. A composite blade construction, comprising a blade root for connection to a rotor hub defining a rotational axis, mounting means for securing said blade root to said rotor hub, a blade body integrally secured to said blade root, said blade body and said blade root comprising fiber composite material including elongated fiber strands extending substantially radially relative to said rotational axis and forming fiber loops around said mounting means, said fiber strands merging with their radially outer ends into said blade body, jacket means covering said blade body, said jacket means comprising mounting flanges formed at a radially inner end of said jacket means near said blade root, said mounting flanges extending substantially perpendicularly to a radial blade plane, means for securing said mounting flanges to a respective rim of said rotor hub, and wherein said mounting means comprise a shackle member having a radially inner end reaching into a radial opening of said rotor hub, said radially inner shackle end having a through-bore extending substantially in parallel to said rotational axis, a mounting bolt extending through said through-bore, said mounting bolt having ends protruding from said first bore into respective bores of said rotor hub for securing said radially inner shackle end to said rotor hub, and tie means having tie ends projecting from a radially outer shackle end for holding a respective group of fiber loops.

4,966,528

APPARATUS FOR CONTROLLING THE HYDRAULIC CIRCUIT OF A PISTON DIAPHRAGM PUMP

Wolfgang E. Henkel, Hockenheim; Volker Stapelfeldt, Ratzeburg, and Dietrich Belling, Büchen, all of Fed. Rep. of Germany, assignors to Abel Pumpen GmbH & Co. KG, Buchen, Fed. Rep. of Germany, a part interest

Filed Feb. 8, 1989, Ser. No. 307,888
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 8801660[U]
Int. Cl.[5] F04B 21/00, 35/02, 43/08
U.S. Cl. 417—63 10 Claims



1. An apparatus for controlling the hydraulic circuit of a piston diaphragm pump having a pump diaphragm alternatingly subjected to the pressure or the suction stroke of a piston operatively connected to driving means, the apparatus comprising:

a displacement sensor associated with one side of said diaphragm facing said hydraulic medium, said sensor measuring the stroke travel of said diaphragm and generating a corresponding stroke travel signal,

a control means for changing the amount of hydraulic medium displaced by said pistion in dependence of a power demand or the like, the control means receiving said stroke travel signal and including storage means storing a predetermined stroke value set for predetermined hydraulic powers of said pump, comparision means for comparing said stroke travel signal with said predetermined stroke value set and control signal generating means generating a control signal if said measured stroke travel deviates from said predetermined value set, and

a reservoir for hydraulic medium connected to said hydraulic circuit through two valves controllable in response to said control signal, the valve seat of one valve being immersed in the hydraulic medium and selectively openable to expel the hydraulic medium from the hydraulic circuit

during the piston pressure stroke and to introduce hydraulic medium into the circuit during the piston suction stroke, and the other valve having its valve seat above the level of the hydraulic medium and selectively openable to expel air from the hydraulic circuit during the piston pressure stroke and to introduce air into said circuit during the piston suction stroke,

and said control means generating a control signal to selectively open the valves for limited times in correspondence with the cycle of said piston and in dependence on the stroke travel of said diaphragm.

4,966,529

STROKE DETECTION CORRECTING SYSTEM FOR VARIABLE DISPLACEMENT TYPE COMPRESSOR

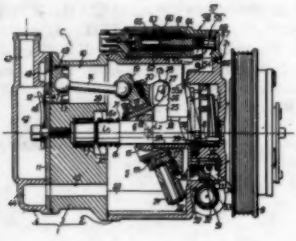
Yutaka Ide, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 25, 1989, Ser. No. 412,050

Claims priority, application Japan, Sep. 26, 1988, 63-240285

Int. Cl.[5] F04B *9/00*

U.S. Cl. 417—218 **3 Claims**



1. A stroke detection correcting device for variable displacement type compressors, comprising:

a variable displacement type compressor including a plurality of working pistons operatively connected to an internal combustion engine and variable in stroke;

stroke detecting means for detecting the operation stroke of the working pistons;

switching means for changing the switching mode when the stroke of each working piston is in a given range previously set; and

correcting means for correcting the detected value from said stroke detecting means on the basis of a predetermined value in accordance with the changing of the switching mode of said switching means.

4,966,530

HYDRAULIC PUMP AND MOTOR ASSEMBLIES FOR VEHICLE HYDRAULIC SYSTEMS

Redmond McCusker, Birmingham, England; Helmut Heibel, Moschheim, and Leo Gilles, Koblenz, both of Fed. Rep. of Germany, assignors to 501 Lucas Industries Public Ltd. Company, Birmingham, England

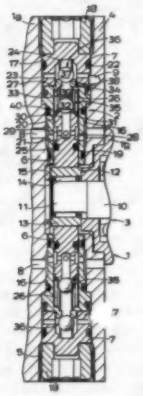
Filed Aug. 3, 1989, Ser. No. 389,062

Claims priority, application United Kingdom, Aug. 9, 1988, 8818912

Int. Cl.[5] B05D *3/00, 3/12*

U.S. Cl. 417—273 **12 Claims**

1. An hydraulic pump and motor assembly for a vehicle hydraulic system, said pump being operated by said motor to pump hydraulic fluid in an hydraulic circuit of said system, said assembly having a housing accommodating said pump and said motor, said pump comprising bore means defined in said housing, together with a reservoir port and a delivery port for connection to said hydraulic circuit, and spring-loaded piston means working in said bore means to pump hydraulic fluid from said reservoir port to said delivery port, said motor having a rotary output shaft, an eccentric mounted on said output shaft, and cam bearing means mounted on said eccentric, with said piston means operated from said eccentric through said cam bearing means, said assembly including retaining means



for said piston means to limit radially inwards movement of said piston means in said bore means, when said motor output shaft is withdrawn from said housing, to an amount insufficient to break said hydraulic circuit.

4,966,531

VARIABLE DISPLACEMENT VANE COMPRESSOR

Shigeru Suzuki; Katsuhiko Ohshiro, and Yasushi Watanabe, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Continuation-in-part of Ser. No. 304,877, Jan. 30, 1989, Pat. No. 4,846,632, which is a division of Ser. No. 902,311, Aug. 29, 1986, abandoned. This application May 5, 1989, Ser. No. 348,287

Claims priority, application Japan, Sep. 2, 1985, 60-193328

Int. Cl.[5] F04B *49/02;* F04C *29/08*

U.S. Cl. 417—295 **1 Claim**

1. A variable displacement vane compressor for an air conditioning system used in a vehicle such as an automobile, which comprises:

a housing (12) having opposed end walls;

a cylinder assembly (18) including a cylindrical body (20) having a bore (22) and first and second end wall members (24, 26) secured to opposed ends of said cylindrical body (20), respectively, for closing open ends of said bore (22), said cylinder assembly (18) being housed within said housing (12) so that a first chamber and a second chamber (28, 30) are formed between said first and second end wall members (24, 26) and the opposed end walls of said housing (12), respectively, said first and second chambers (28, 30) being in communication with an evaporator and a condenser of the air conditioning system, respectively;

a rotor (36) disposed within said bore (22) for rotation to form at least one crescent chamber (38) between said rotor (36) and the bore (22) of said cylinder assembly (18), said rotor (36) having at least a vane (56) extendably fitted in

said rotor (36) so that a free end of said vane (56) is in contact with a circumferential inner wall surface of said bore (22) during rotation of said rotor (36);

an annular plate member (70) disposed between the first end wall member (24) and an associated end portion of said cylindrical body (20) and being partially rotatable between said first and second positions;

said first end wall member (24) having an elongated arcuate slot (80) formed therein in the vicinity of one of narrow ends of said crescent chamber (38) which said vane (56) passes when passing through said crescent chamber (38) during rotation of said rotor (36), said annular plate member (70) having an elongated arcuate slot (74) formed therein and being arranged so that the slot (74) formed therein is fully opened to the elongated arcuate slot (80) of said first end wall member (24) when said annular plate member (70) is positioned at said first position, and that as said annular plate member (70) is rotated from said first position toward said second position, and opening area of the elongated arcuate slot (74) of said annular plate member (70) with respect to the elongated arcuate slot (80) of said first end wall member (24) is gradually reduced, whereby when said annular plate member (70) is positioned at said first position, a maximum amount of refrigerant is introduced from said first chamber (38) into said crescent chamber (38) through both said elongated arcuate slots (80, 74) and is then compressed by said vane (56) during the passage thereof through said crescent chamber (38), and whereby when said annular plate member (70) is positioned at said second position, a minimum amount of refrigerant is introduced from said first chamber (38) into said crescent chamber (38) through both said elongated arcuate slots (80, 74) and is then compressed by said vane (56) during the passage thereof through said crescent chamber (38);

said cylindrical body having an exit port formed therein at the other of the narrow ends of said crescent chamber (38) which said vane (56) later passes when passing through said crescent chamber (38) during the rotation of said rotor (36), said exit port being opened into said crescent chamber (38) into said second chamber (30) through said exit port (64);

the elongated arcuate slot (74) of said annular plate member (70) having a length longer than a width of said vane (56) so that when said vane (56), by which said crescent chamber is divided into the front chamber section and the rear chamber section, sweeps over the elongated arcuate slot (74) of said annular plate member (70), a part of the introduced refrigerant is bypassed from said front chamber section to said rear chamber section;

said annular plate member (70) also having at least two openings (76, 78) which are formed therein between the other of said narrow ends of said crescent chamber and said elongated arcuate slot (74), said first end wall member (24) having an elongated arcuate opening (82) which are formed therein so as to cooperate with the at least two openings (76, 78) of said annular plate member (70) in such a manner that when said annular plate member (70) is in said first position, the at least two openings (76, 78) of said annular plate member (70) remain closed with respect to the elongated arcuate opening (82), that when said annular plate member (70) is in an intermediate position between said first and second positions, one (76) of the at least two openings (76, 78) of said annular plate member (70) opens into the elongated arcuate opening (82) of said first end wall member (24) to allow a part of the compressed refrigerant to escape from the front chamber section of said crescent chamber (38) into said first chamber (28), and that when said annular plate member (70) is in said second position, the at least two openings (76, 78) of said annular plate member (70) completely open into the elongated arcuate opening (82) of said first end wall member (24) to obtain a maximum rate of escape of the compressed refrigerant from the front chamber section of said crescent chamber (38) into said first chamber (28), the at least two openings (76, 78) of said annular plate member (70) each being substantially equal to or smaller than by the width of said vane (56) so that when said vane (56) sweeps over the at least two openings (76, 78) of said annular plate member (70), the compressed refrigerant is prevented from escaping from the front chamber section of said crescent chamber (38) to the rear chamber section thereof;

the at least two openings (76, 78) of said annular plate member (70) are spaced from each other so that said at least two openings (76, 78) are in communication with the elongated arcuate opening (82) of said first end wall member (24) at the second position of said annular plate member (70) when said vane (56) is at midway between said at least two openings (76, 78); and

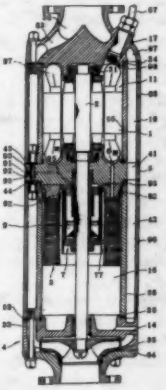
a drive means for moving said annular plate member (70) between said first and second positions in response to a change of a cooling load at the air conditioning system.

4,966,532

ALL DRY SUBMERSIBLE MOTOR PUMP WITH A CONCORDANT SEAL SYSTEM

Lu Fengsheng, 1-50-204, Xian Jiao Tong University, Xian, Shaanxi, China

Filed Jan. 17, 1989, Ser. No. 297,356
Claims priority, application China, Feb. 6, 1988, 88100735.8
Int. Cl.[5] F04B *39/00, 47/06*
U.S. Cl. 417—366 **19 Claims**



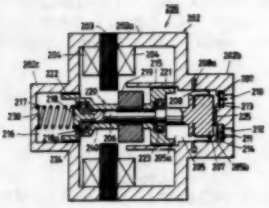
1. An all-dry submersible motor pump comprising a motor within a motor room, a vertical rotary shaft driven by the motor and connected to a pump means, an air chamber positioned between the motor room and the pump means, a radial airtight disc provided between the motor room and the air chamber with a central hole for passing through the vertical rotary shaft, and a concordant seal means arranged below the disc and around the central hole, wherein said concordant seal means comprises a shaft fluid-seal means and a pressure equalizing means, said shaft fluid-seal means further comprising a sealing tube and a sealing cup arranged concentrically with the rotary shaft and adapted to rotate relatively, said cup being filled with a certain amount of sealing liquid, and said pressure equalizing means comprising an air envelope, the outer surface of which being exposed to the pressure of the air chamber and having an opening through which the air envelope communicates only with the motor room.

4,966,533

VACUUM PUMP WITH ROTATIONAL SLIDING PISTON SUPPORT

Akito Uchida, and Iwao Sakaguchi, both of Nagano, Japan, assignors to Kabushiki Kaisha Nagano Keiki Seisakusho, Tokyo, Japan

Filed Jul. 14, 1988, Ser. No. 218,775
Claims priority, application Japan, Jul. 14, 1987, 62-173948; Jul. 14, 1987, 62-173949; Jun. 29, 1988, 63-159189
Int. Cl.[5] F04B *43/04, 17/04*
U.S. Cl. 417—413 15 Claims



1. A vacuum pump comprising:

a casing which defines therein a pumping chamber and an operational chamber; said pumping chamber having a side formed with intake and discharge means and having another side positioned in confrontation with said operational chamber;

a piston reciprocally disposed in said pumping changer, said piston dividing said pumping chamber into front and rear compartments;

an operational mechanism disposed in said operational chamber for moving said piston;

a piston rod having one end connected to said piston and another end portion, said piston rod extending through said rear compartment and said operational chamber;

a rotationally sliding member disposed over said piston rod; and

bearing means disposed between said rotationally sliding member and said piston rod for rotatably supporting said rotationally sliding member with respect to said piston rod, said rotationally sliding member being in rotational slide contact with said casing, whereby said rotationally sliding member is rotatable during axial movement of said piston rod;

said operational mechanism comprising:

a solenoid mechanism including an armature portion provided on said piston rod, and an electromagnet provided in said operational chamber for moving said piston in a first direction; and,

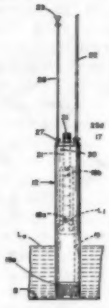
a restoration spring member for moving said piston in a second direction opposite said first direction; said armature portion being positioned between said electromagnet and said rear compartment of said pumping chamber, energization of said solenoid mechanism moving said piston in said first direction against as biasing force of said restoration spring for introducing fluid into said front compartment through said intake means, and deenergization of said solenoid mechanism moving said piston in said second direction by biasing force of said spring for discharging said fluid in said front compartment through said discharge means.

4,966,534

SUMP DRAINING APPARATUS

John S. Hasslen, III, 1033 Manor Pl., Elk River, Minn. 55330

Filed May 2, 1989, Ser. No. 346,396
Int. Cl.[5] F04B *35/04*
U.S. Cl. 417—423.3 21 Claims



1. Sump draining apparatus comprising:

sealed canister means having upper and lower portions and defining an internal chamber, the canister means comprising a liquid inlet disposed in the lower portion and a liquid discharge outlet disposed in the upper portion;

liquid pumping means disposed within the internal chamber of the canister means, the liquid pumping means having a pump inlet remote from the liquid inlet of the canister means and a pump outlet;

motor means for driving the pumping means, the motor means being disposed within the canister means between said liquid inlet and said pump inlet;

conduit means establishing liquid communication between the pump outlet and the discharge outlet of the canister means;

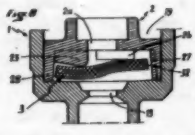
and venting means for exhausting air from the internal chamber as the level of liquid rises from the canister means inlet to the pump inlet.

4,966,535

NON-RETURN VALVE FOR ADMITTING A LIQUID TO BE SPRAYED INTO A PUMP CHAMBER, AND UTILIZATION THEREOF

Jean-Pierre Lina, Le Neubourg, and Patrick Di Giovanni, Elbeuf, both of France, assignors to Valois, Le Neubourg, France

Filed Jan. 5, 1990, Ser. No. 461,498
Claims priority, application France, Jan. 6, 1989, 89 00127
Int. Cl.[5] F16K *15/02*
U.S. Cl. 417—553 8 Claims



1. A non-return valve for admitting a liquid to be sprayed into a pump chamber, said valve being constituted by co-operation between three components:

a pump cylinder having an internal narrowing separating a body and an end, said body housing said pump chamber

whereas said end is in communication with a supply of said liquid;

a hollow sleeve having an end pierced by a central hole and a side wall suitable for being received in sealed manner inside said body such that said sleeve and said narrowing together define a housing; and

a gasket in the form of a disk suitable for being received with clearance inside said housing;

wherein:

said narrowing is shaped, on its side adjacent said body, in the form of a cup of small slope;

said side wall of said sleeve flares from said end of said sleeve and is locally provided with a swelling, said side wall of said sleeve being of reduced thickness on either side of said swelling; and

said end of said sleeve includes a tongue and two ribs, said tongue and said ribs extending from said side wall of said sleeve to the central hole of said sleeve, said tongue being diametrically opposite said swelling and being of increased thickness adjacent to said central hole of said sleeve, said ribs being symmetrically disposed about a diameter passing through said swelling and said tongue so that each of them forms an acute angle with said diameter on respective sides of said swelling.

4,966,536

FILM BLOWING LINE WITH ROLL

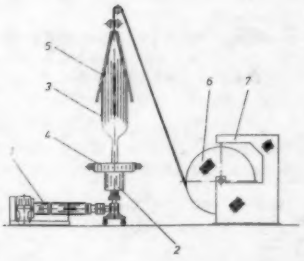
Karl Veit-Holger, Nürnberger Stasse 119, D-8700 Würzburg, Fed. Rep. of Germany

Filed Dec. 21, 1988, Ser. No. 288,006

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743721

Int. Cl.[5] B29C *47/92*

U.S. Cl. 425—72.1 **4 Claims**



1. A film blowing line with a winding roll, comprising:

an extruder serving to convey a film of plastic material;

a blow head connected to said extruder;

an air-cooling ring located on said blow head;

means for folding said film, said folding means being positioned downstream of said air cooling ring;

said winding roll having a longitudinal axis and positioned to receive said film from sand means for folding;

means for measuring the diameter of said roll, including said film of plastic material along said longitudinal axis, said means for measuring including means for controlling the thickness of said roll responsive to said measuring means.

4,966,537

HAND-OPERATED DISPENSERS OF SEMI-SOLID MATERIALS SUCH AS ICING FOR CAKES

William B. Bowles, and Margaret A. Bowles, both of Aldershot, United Kingdom, assignors to John W. Dixon, United Kingdom

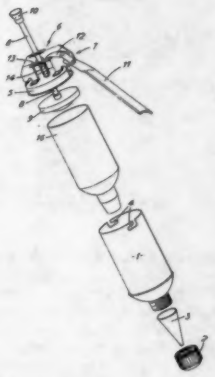
PCT No. PCT/GB88/00392, § 371 Date Jan. 19, 1989, § 102(e) Date Jan. 19, 1989, PCT Pub. No. WO88/09128, PCT Pub. Date Dec. 1, 1988

PCT Filed May 18, 1988, Ser. No. 303,726

Claims priority, application United Kingdom, May 19, 1987, 8711835

Int. Cl.[5] B05C *17/00*; A23G *3/28*

U.S. Cl. 425—87 **8 Claims**



1. A hand-held dispenser of semi-solid material comprising: a cylindrical body adapted to contain semisolid material; a piston on a piston rod having an uninterrupted surface and adapted to be driven into one end of the cylinder of the body to eject a stream of material from a nozzle-opening at an outer end of the cylinder; a lever pivotally mounted adjacent said one end of the cylindrical body and adapted to drive the piston rod with its piston incrementally inwardly as the lever is pressed towards the cylinder, the lever having a pivot point and being located generally alongside the cylinder so that the cylinder can be held and the lever pressed by one hand; a plate penetrated by said piston rod and adapted to be tilted by said lever to grip said uninterrupted surface of the piston rod and to drive the piston rod through infinitely variable distances, the plate being spring-loaded with a compression spring to free the piston rod on release of pressure on the lever and so release completely the pressure on any semi-solid material contained in the cylindrical body; and an operating mechanism between said lever and said plate comprising a pivotal link which has a pivot point spaced from the lever's pivot point, which engages said plate and which is arranged to be pivoted by said lever to drive said plate against the action of the compression spring.

4,966,538

MOUNTING PRESS

Thomas A. Linke, Wadsworth; Troy W. Livingston, Northbrook; Christopher D. Wanha, Chicago, and Charles E. Shewey, Mundelein, all of Ill., assignors to Buehler, Ltd., Lake Bluff, Ill.

Filed Jun. 1, 1988, Ser. No. 201,061

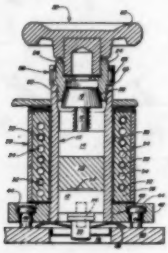
Int. Cl.[5] B29C *43/58, 33/20*

U.S. Cl. 425—144 **17 Claims**

1. In molding apparatus which comprises a tubular molding chamber; a ramhead sealingly movable along the length of the interior of said chamber; and fluid pressure means for advanc-

ing and retracting said ramhead along said chamber; the improvement comprising, in combination:

hydraulic chamber means; a shaft extending axially from said ramhead into said hydraulic chamber in sealing manner and terminating in a sliding piston within said hydraulic chamber to divide said hydraulic chamber into a pair of variable volume portions positioned on opposed sides of said piston, each portion being connectable by hydraulic flow conduit means to a source of pressurized hydraulic fluid, to permit driven movement of said piston in said chamber; pressure sensing means operably connected to the hydraulic chamber portion which is spaced from said



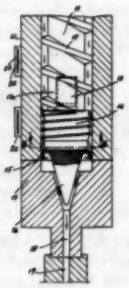
ramhead by said piston; and logic and control means operably connected to said pressure sensing means and pressurized hydraulic fluid source to control the pressure of hydraulic fluid in said spaced chamber portion in a manner responsive to signals from said pressure sensing means; said molding chamber being surrounded by a sleeve member, said sleeve member containing spaced, interwinding heating and cooling coils mounted therein; temperature measuring means positioned adjacent said molding chamber; and control means for operating said heating and cooling coils in a manner responsive to signals from said temperature measuring means.

4,966,539

SEAL FOR PISTON SCREWS IN PLASTICS INJECTION AND EXTRUSION APPARATUS

Juan R. Pena, Arquimedes, s/n, Badalona, Barcelona, Spain

Filed Jul. 18, 1988, Ser. No. 220,669
Claims priority, application Spain, May 12, 1988, 8801917
Int. Cl.[5] B29C *45/52*
U.S. Cl. 425—208 **4 Claims**



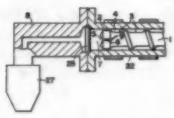
1. In an extruder having an extruder barrel, an extruder screw in the barrel, and means for moving the extruder screw axially in the barrel between respective forward and back positions for charging and extrusion respectively, the improvement comprising a tip seal device at a forward end of the screw, said device including a radially expandable and contractible circumferential skirt, the skirt contracting radially responsive to pressure of molding material from behind the skirt to allow passage of the material over the skirt for extrusion when the screw is in the back position, and the skirt expanding radially into contact with the barrel responsive to pressure of material from in front of the skirt when the screw is in the forward position.

4,966,540

MOLDING MACHINES USING ROTARY SCREWS

Masaru Taguchi; Yasuhiro Kuroki; Yoshiharu Uchida, and Saburo Kawano, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 376,617
Claims priority, application Japan, Jul. 11, 1988, 63-172464
Int. Cl.[5] B29C *47/64*
U.S. Cl. 425—208 **9 Claims**



1. A molding machine comprising:

a heating cylinder;

a hopper cylinder for supplying a plastic resin into said heating cylinder;

a rotary screw contained in said heating cylinder for plasticizing said plastic resin;

a metering section provided for a portion of said rotary screw downstream from said hopper cylinder;

an inner surface of said heating cylinder and a front end of said rotary screw defining a throttle member therebetween, and

the rotary screw being provided with at least one inclined passage communicated with said metering section and said throttle member, and at least one slot extending from the front end of the rotary screw communicating with said inclined passage;

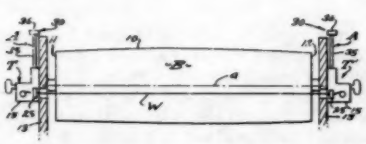
whereby plasticized resins passing through said throttle member and said slot are mixed together in a space in front of the front end of said rotary screw.

4,966,541

SHEETING HEAD STRIPPER WIRE ADJUSTER

Joseph L. Mistretta, 3177 Mohawk Trial, Riverside, Calif. 92503

Filed Apr. 24, 1989, Ser. No. 342,118
Int. Cl.[5] A21C *3/02*
U.S. Cl. 425—229 **16 Claims**



1. A stripper wire adjuster for a sheeting head used in processing dough into thin sheets of uniform thickness;

the sheeting head having counterrotating rollers disposed within frame members and on spaced and parallel horizontally disposed axes and having closely juxtaposed periph-

eries between which the dough is drawn, there being a stripper wire extending between opposite ends of the rollers and spaced in the direction of roller rotation and away from a plane coincidental with the said parallel axes,

the stripper wire being anchored at opposite ends to tensioning means carried outside the frame members to engage against the periphery of one of said rollers,

and adjustment means at opposite ends of the one of said rollers for positioning the stripper wire in adjusted spaced relation from said plane coincidental with the said parallel axes, and each adjustment means including a wire guide shiftable in a vertical plane normal to said plane coincidental with the said parallel axes and positioning the stripper wire between the tensioning means and the ends of said one roller, and an accessible infinitely variable positioning means controlling the vertical height position of the wire guide and of the stripper wire into peripheral engagement with the end of said one roller,

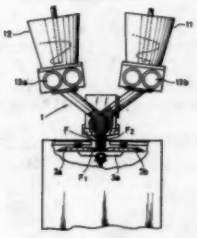
whereby horizontal height adjustment of the stripper wire can be performed during operation of the sheeting head.

4,966,542

APPARATUS FOR THE FORMATION OF A SHAPED FOOD PRODUCT

Masao Kobayashi, 413-2, Nittazaka, Fukui-shi, Fukui-ken, Japan

Filed Aug. 8, 1989, Ser. No. 390,736
Claims priority, application Japan, Aug. 12, 1988, 63-202592
Int. Cl.[5] A21C *3/04, 11/10*; A21G *3/12*
U.S. Cl. 425—307 **19 Claims**



1. An apparatus for the formation of a shaped food product comprising:

(a) forming and cuting means having two pairs of variable radius cutters disposed at two steps corresponding to an upper and a lower side, each cutter having a blade portion circumferentially thereon and formed having a radius regularly increasing through 360° of arc about a central axis of the cutter and then abruptly decreasing thus forming an acute angle edge, and the said two pairs of cutters being disposed symmetrically and horizontally so that each blade makes frictional contact with an opposite cutter at a point of maximum radius;

(b) self rotation and orbital revolution means of the said cutters for rotating each opposite cutter about an axis in a reverse direction while the cutters collectively revolve orbitally about an orbit axis in the same direction constantly, wherein a passage is formed between the cutters which is opened and closed with rotation and orbiting of the cutters;

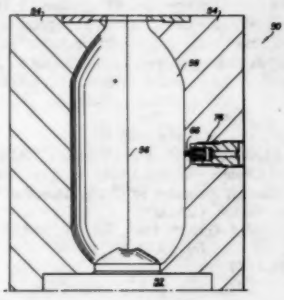
(c) extruder means adapted to extrude food material in the form of a column successively into the passage from an upper side, the passage being formed by the expansion or reduction of the said cutter radius size measured from the orbit axis to the rotation axes of the cutters caused by the rotation of each cutter.

4,966,543

APPARATUS FOR FORMING A VENTED RECYCLABLE MULTILAYER BARRIER CONTAINER

Suppayan M. Krishnakumar, Nashua; Thomas E. Nahill, Amherst, and Wayne N. Collette, Merrimack, all of N.H., assignors to Continental PET Technologies, Inc., Norwalk, Conn.

Division of Ser. No. 7/270,840, Nov. 14, 1988. This application Dec. 21, 1989, Ser. No. 454,454
Int. Cl.[5] B29C *49/62*
U.S. Cl. 425—522 **5 Claims**



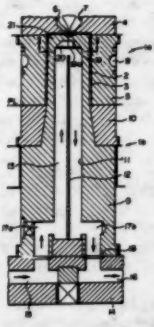
1. In an apparatus for forming a blow molded container having a laminated body wall including an outer layer, a gas barrier layer and at least one inner layer, and there being at least one vent opening in said container body from the exterior of said container entirely through said outer layer and said gas barrier layer, said apparatus comprising a blow mold having a cavity for blow molding said container from a preform formed with said outer layer, said gas barrier layer and said at least one inner layer, and forming means for forming said vent opening entirely through said outer layer and said gas barrier layer and terminating in said body wall.

4,966,544

INJECTION MOLD HAVING COOLING FINS

Hiroshi Mitake, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 28, 1989, Ser. No. 399,393
Claims priority, application Japan, Jul. 22, 1987, 62-183063
Int. Cl.[5] B29C *45/73*
U.S. Cl. 425—552 **3 Claims**



1. An injection mold for injection-molding a tubular shaped article from a molten material, said article having a bottom at one end thereof and an opening at another end thereof, said mold comprising a female mold and a male mold which, when

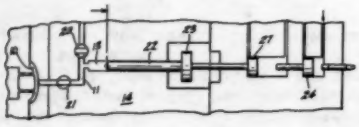
closed, define a cavity conforming to the shape of said article, said female mold having a gate opening communicating with the cavity at a portion defining the bottom of the article, said male mold having a blind hole provided therein and a baffle plate disposed in said blind hole so as to axially extend from an opening of the blind hole to a cooling position spaced from an end of the blind hole so as to define a cooling channel within said blind hole around said baffle plate for circulating coolant up to said cooling position, the end of said blind hole having a conical shape and being positioned in opposition to said gate opening of said female mold, wherein at least one rib-like fin is provided on the end of the blind hole to assist in cooling of said molten material in a vicinity of said gate opening, said at least one fin projecting into the cooling position in said cooling channel and extending perpendicular to said baffle plate so as to be parallel to the direction of coolant flow.

4,966,545

STAGED SHOOTING POT FOR INJECTION MOLDING

Paul Brown, Orangeville, and Vitaly Akselrud, Richmond Hill, both of Canada, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada

Filed Apr. 19, 1989, Ser. No. 340,256
Int. Cl.[5] B29C 45/54
U.S. Cl. 425—557 **8 Claims**



1. An injection molding apparatus which comprises: at least one mold cavity; a hot runner system for supplying thermoplastic material to said mold cavity; supply means for supplying thermoplastic material to the hot runner system; a shooting pot operative to hold a given amount of thermoplastic material communicating with the hot runner system and supplied thereby; a first valve means between the supply means and the shooting pot and a second valve means between the shooting pot and the mold cavity, both of said valve means being operative to permit and block flow of thermoplastic material; a first injection means communicating with said shooting pot for delivering a first charge of thermoplastic material from the shooting pot to the mold cavity; said first injection means including a first stage injection piston situated in a first stage injection cavity; a second injection means communicating with said shooting pot for delivering a second charge of thermoplastic material from the shooting pot to the mold cavity; said second injection means including a second stage injection piston situated in a second stage injection cavity; and including a first stage actuating means of said first stage injection means which contacts and actuates the second stage injection piston for delivery of the first charge of thermoplastic material.

4,966,546

CONVECTIVE THERMOFORMING OVEN

Wen-Pao Wu, Pittsford, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 1, 1989, Ser. No. 346,032
Int. Cl.[5] F27B 9/04
U.S. Cl. 432—121 **9 Claims**

1. An oven system for the convective heating of a continuous web of a member selected from the group consisting of a thermoformable foam sheet and thermoformable film material comprising in combination:

(a) a convection heating oven having an inlet and an outlet end;

(b) a continuous supply of said thermoformable web and means for transporting said web through said oven in a continuous or intermittent manner;

(c) a source of heated gaseous medium and conveying means for exposing said web to said heated medium;

said oven including a first longitudinally extending plate on one side of said web, said first plate forming a first space between said first plate and a wall of said oven and a second space between said first plate and said web, said second space being in communication with said first space at said inlet and outlet ends; a second longitudinally extending plate on the other side of said web, said second

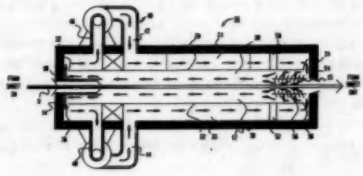


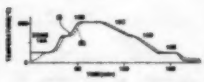
plate forming a third space between said second plate and another wall of said oven and a fourth space between said second plate and the other side of said web, said fourth space being in communication with said third space at said inlet and outlet ends; and said heating medium conveying means being adapted to convey said medium through said first and third spaces in the direction of transport of said web through said oven and recirculating said medium through said second and fourth spaces in a flow along the surfaces of said web countercurrent to the direction of transport of said web.

4,966,547

HEAT TREATMENT METHOD USING A ZONED TUNNEL FURNACE

Takashi Okuyama, Taki, and Yutaka Yamauchi, Matsusaka, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Mar. 31, 1989, Ser. No. 330,899
Claims priority, application Japan, Mar. 31, 1988, 63-79087
Int. Cl.[5] F27B 9/00
U.S. Cl. 432—9 **6 Claims**



1. A method of heat treating a plurality of workpieces in succession by passing each workpiece through a tunnel furnace partitioned into a plurality of zones which are in series and adjacent to each other by selectively openable shutters, the method comprising the steps of:

controlling temperatures of each of said zones independently of the other of said zones;

controlling the length of stay of each workpiece in at least one zone of the furnace; and

in each of said at least one zone, varying the temperature of that zone from a first temperature to a second temperature during the stay of each workpiece in that zone and returning the temperature of that zone to said first temperature in a predetermined time after letting the workpiece out of that chamber and before taking another workpiece into that zone, and in each of said at least one zone of the furnace the length of stay of each workpiece in that zone and the length of said predetermined time are controlled such that the sum of said length of stay and the length of

said predetermined time is constant in all of said at least one zone.

4,966,548

GRATE COOLER DEVICE FOR THE HEAT TREATMENT OF BULK MATERIAL

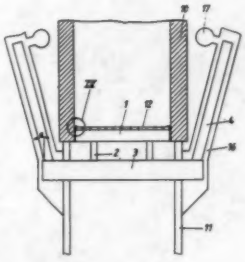
Karl von Wedel, Amselstrasse 5, 3057 Neustadt 1, Fed. Rep. of Germany

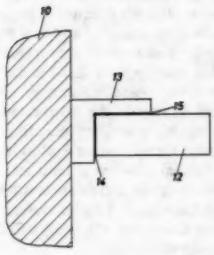
Filed Dec. 22, 1989, Ser. No. 454,970

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1988, 3844493

Int. Cl.[5] F27D *15/02*

U.S. Cl. 432—77 **5 Claims**





1. A grate cooler device for the heat treatment of particularly fine, bulk material to be transported along said grate cooler device in a predetermined direction, comprising

(a) upper and lower housing means; said lower housing means being charged with a pressurised cooling medium;

(b) a plurality of rows of grate plates arranged transversely with respect to said direction of transport of said bulk material, said rows being at least partially mobile, and said grate plates partially overlapping each other;

(c) mobile frame means formed by longitudinal and transverse beams carrying said grate plates; and

(d) elongated tension strand means for suspending said mobile frame means,

wherein

(e) said tension strand means form an angle α of more than 3 degrees relative to an imaginary perpendicular plane of said grate cooler extending in said direction of transport.

4,966,549

WAFER HANGER USEFUL FOR THERMALLY TREATING SEMICONDUCTOR WAFERS

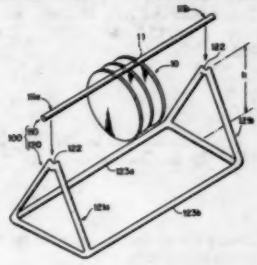
Mituo Obdate, Fukuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

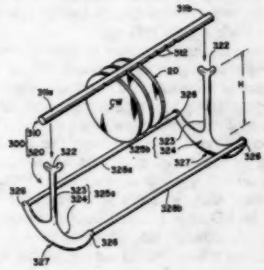
Filed Oct. 20, 1989, Ser. No. 424,826

Claims priority, application Japan, Jul. 11, 1989, 1-178424

Int. Cl.[5] F27D *5/00*

U.S. Cl. 432—253 **12 Claims**





1. A wafer hanger useful for hanging semiconductor wafers therefrom in a furnace in order to thermally treating said wafers, comprising:

(a) a rod member capable of being inserted into respective engage holes formed in edge portions of said wafers; and

(b) a supporting member for supporting said rod member in a horizontal direction at both end portions of said rod member,

wherein said rod member is separatable from said supporting member, and

said rod member and said supporting member are made of a material resistant to a temperature for a heat treatment of said wafers in said furnace.

6. A wafer hanger useful for hanging semiconductor wafers therefrom in a furnace in order to thermally treating said wafers, comprising:

(a) a rod portion having a linear array of tapered notches which are aligned in an axial direction of said rod portion, each of said tapered notches having an opening whose width is larger than respective thickness of said wafers and a bottom whose width is smaller than said respective thickness, said rod portion being made of a first material which is resistant to a temperature for a heat treatment of said wafers and has a thermal expansion coefficient smaller than a thermal expansion coefficient of said wafers; and

(b) a supporting portion supporting said rod portion in a horizontal direction at both ends of said rod portion and

being made of a second material resistant to said temperature for said heat treatment,

wherein said wafers can be hung from said wafer hanger by inserting respective end portions of said wafers into said tapered notches, respectively.

4,966,550

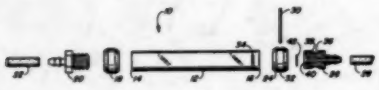
FILTER DEVICE

Richard F. Privat, 23920 Walling Rd., Geyersville, Calif. 95441

Continuation-in-part of Ser. No. 7,185,896, Apr. 25, 1988, abandoned. This application Aug. 21, 1989, Ser. No. 396,551

Int. Cl.[5] A61C *3/00*

U.S. Cl. 433—25 **3 Claims**



1. A filter device for in-line insertion to syringe air supply tubing, said device comprising:

a clear cylinder member having an inside surface, an upstream end and a downstream end;

filter material contained in said cylinder member;

an upstream fitting connected to said cylinder upstream end, said upstream fitting having means for releasable connection to said air supply tubing;

a downstream fitting releasably connected to said cylinder downstream end, said downstream fitting having means for releasable connection to said air supply tubing, said downstream fitting having a circumferential surface bearing a tapered circumferential slot having an upstream side and a downstream side, wherein the depth of said slot decreases in the direction of said downstream side; and

an O-ring carried by said downstream fitting tapered circumferential slot, wherein when said air supply is not flowing, said O-ring rests adjacent said slot upstream side, enabling said downstream fitting to be removed from said cylinder, and when said air supply is flowing, said O-ring is urged against said slot downstream side and seals against said cylinder inside surface.

4,966,551

VACUUM EVACUATOR FOR DENTAL DEBRIS

Frank A. Betush, 375 Hargrave, Inglewood, Calif. 90302

Filed Jun. 28, 1988, Ser. No. 212,618

Int. Cl.[5] A61C *17/14*

U.S. Cl. 433—95 **3 Claims**

1. A vacuum-type instrument comprising: an elongated open-ended tubular member having a longitudinal passage extending therethrough for drawing debris from the mouth of a patient during a dental procedure and having a second end for receiving a quick-disconnect coupler coupled to a line extending to a vacuum source, said second end having a circumferential ridge to be received in an internal groove in said coupler in a snap-fit relationship, said tubular member having a circular transverse opening therein; a solid cylindrical valve member received in the transverse opening in said tubular member and having a transverse port extending therethrough, said valve member being rotatable in said transverse opening between first and second angular positions to open and close the longitudinal passage through said tubular member said valve member having a pair of circumferential ridges formed on opposite ends of said transverse port and a pair of longitudinal ridges formed on opposite sides of said transverse port to provide seals between the surface of said valve member and the wall of said longitudinal passage; and a u-shaped handle positioned externally of said tubular member for turning said valve member and for retaining said valve member in said transverse opening, said handle having spaced-apart arms engaging the ends of said valve member, with the ends of said valve member and the inner surfaces of the ends of said arms being configured to interact with one another so as to couple the handle to the valve member.

4,966,552

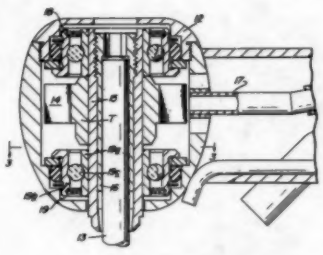
STERILIZABLE NON-LUBRICATED ROTARY INSTRUMENT FOR DENTAL AND MEDICAL USE

Donald I. Gonser, Lancaster, Pa., assignor to Den-Tal-Ez, Inc., Audubon, Pa.

Filed May 8, 1989, Ser. No. 348,722

Int. Cl.[5] A61C *1/05*

U.S. Cl. 433—132 **20 Claims**



1. In a hand-held instrument particularly suited for use in medical and dental applications requiring periodic sterilization, the instrument including a handle, a rotary tool adapted to be carried by the handle, and an anti-friction bearing assembly for rotatably mounting the tool to the handle, the instrument handle adapted to being releasably secured to a power supply for the rotary tool to enable the instrument to be sterilized periodically, the bearing assembly including inner and outer raceways containing therebetween a plurality of rolling elements, the improvement wherein at least said rolling elements are formed of a hard, dense, wear-resistant non-metallic material, whereby the instrument can be sterilized repeatedly in hostile environments without adversely affecting the performance of the bearing assembly.

4,966,553

SET OF ATTACHMENT ELEMENTS FOR DENTAL PROSTHESES

Sami Sandhaus, Ecublens, Switzerland, assignor to Pharma Diffusion S.A., Switzerland

Filed Apr. 17, 1989, Ser. No. 339,160

Claims priority, application European Pat. Off., Apr. 27, 1988, 88810272.0

Int. Cl.[5] A61C *13/22*

U.S. Cl. 433—181 **2 Claims**

1. A set of attachment elements for dental prostheses comprising in combination:

a calcinable prismatic post having a base portion;

a calcinable lateral support arm connected to said base portion, transversely to the prismatic post;

a calcinable cylindrical socket having a longitudinal hole, said cylindrical socket being connected to said lateral support arm at a distance from said prismatic post and in parallel relationship therewith;

a first concave lateral face on said prismatic post, said first face being directed towards said cylindrical socket;

a second concave lateral face on said prismatic post, said second face being opposed to said first concave lateral face;

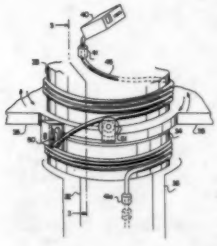
a plurality of interchangeable calcinable liaison means; and means for alternatively fastening said liaison means one at a time to said cylindrical socket.

4,966,554

APPARATUS AND METHOD FOR PASSING A CONTINUOUS CONDUIT THROUGH A ROTATABLE MEMBER

Yasuhiro Tsukamoto, Patchogue, N.Y., assignor to Izumi Corporation, Patchogue, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,365
Int. Cl.[5] H01R *35/04*
U.S. Cl. 439—15 **26 Claims**



1. Apparatus for passing a conduit or cable from a stationary member through a rotatable member to a second stationary member without interrupting the continuity of said conduit, said apparatus comprising:

(a) a first non-rotatable coil means of a continuous conduit or cable;

(b) a second non-rotatable coil means of said continuous conduit or cable;

(c) said first non-rotatable coil means and said second non-rotatable coil means connected linearly through a rotatable member, said rotatable member and said first non-rotatable coil means and said second non-rotatable coil means having substantially the same axis and

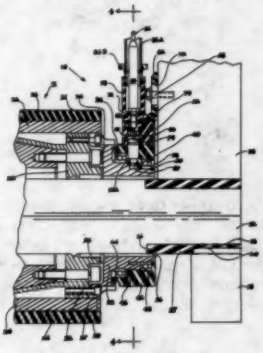
(d) conduit or cable diverting means coupled to said rotatable member and rotatable therewith for diverting a portion of said first non-rotatable coil means through said rotatable member to said second non-rotatable coil means and for positioning said portion of said first non-rotatable coil means on said second non-rotatable coil means as said rotatable member rotates.

4,966,555

ELECTROSTATIC ASSIST ROTOGRAVURE PRINTING SAFETY CONTACT

Gary A. Zagorski, Downers Grove, Ill., assignor to Rotation Dynamics Corporation, Hinsdale, Ill.

Filed Apr. 24, 1989, Ser. No. 342,478
Int. Cl.[5] H01R *39/08*
U.S. Cl. 439—28 **35 Claims**



1. An electrostatic assist rotogravure printing safety contact for conducting a high voltage charge from a power pack to a conductive roller rotating in a rotogravure printing press which can have explosive vapors and contaminants about it, comprising a rotating member being adapted to be physically and electrically connected to and rotate with the conductive roller, a stationary member being adapted to be connected to a stationary portion of the rotogravure printing press, said stationary member and rotating member having adjacent surfaces, brush means including at least two brushes for transferring the same electrical charge between said members, each of said two brushes being mounted on the adjacent surface of one of the members and riding against the adjacent surface of the other of said members, said two brushes being isolated from the explosive vapors, each of said brushes being adapted to be in electrical communication with the power pack, the other of said brushes, and the conductive roller, whereby at least one of said two brushes of said brush means is more likely in electrical contact with the other of said members so that the likelihood of a spark occurring is reduced.

4,966,556

ELECTRICAL CONNECTOR FOR DIRECT CONNECTION TO PLATED THROUGH HOLES IN CIRCUIT BOARD

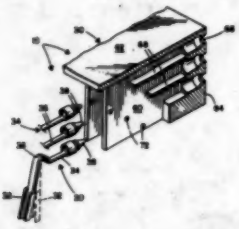
Welles K. Reymond, Waterbury, Conn., and Gregory L. Sorrentino, Brewster, N.Y., assignors to General DataComm, Inc., Middlebury, Conn.

Filed Jun. 13, 1989, Ser. No. 366,546
Int. Cl.[5] H01R *23/70*
U.S. Cl. 439—80 **68 Claims**

1. A pluggable electrical connector for providing a right angled connection between a daughter board and the plated through holes of a mother board, comprising:

(a) a plurality of spring contact elements, each spring contact element having a first portion for electrically contacting said daughter board, a middle portion bent over a radius of approximately ninety degrees, and a second portion including a tapered contact portion, said tapered contact portion decreasing in cross sectional area as it extends away from said middle portion, said tapered portion for mating with a rim of a said plated through hole of said mother board; and

(b) a dielectric housing for housing said plurality of spring contact elements such that said plurality of spring contact elements are electrically insulated one from the other, wherein said middle portion of each of said spring contact



elements is compliant to permit movement of said middle portion substantially along an axis perpendicular to a plane defined by said mother board when said tapered contact portion of said spring contact element engages said plated through hole of said mother board.

4,966,557

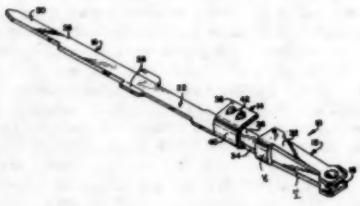
ELECTRICAL CONTACT ELEMENT

Lee A. Barkus, Millersburg; Steven J. Kandybowski, Tower City, and David B. Sinisi, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 129,035, Dec. 4, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 278,119

Int. Cl.[5] H01R *13/428*

U.S. Cl. 439—246 **5 Claims**



5. An improved electrical contact element comprising an elongated base member with a receptacle for receiving a male terminal therein and a termination section attached to opposite ends of said base member, and a U-shaped retention section between and spaced from said receptacle and said termination section, said retention section having first and second legs with a bight attached to and extending therebetween, said first leg being a portion of said base member and said second leg being resilient and extending obliquely outwardly from its attachment to said bight.

4,966,558

COUPLER TERMINAL UNIT FOR SPEAKER

Yutaka Moriyama, Tendo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,520

Claims priority, application Japan, Sep. 24, 1988, 63-240426

Int. Cl.[5] H01R *9/20, 9/24*

U.S. Cl. 439—573 **4 Claims**

1. A speaker unit having a coupler terminal unit, the speaker unit comprising:

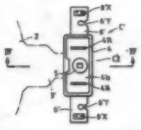
a speaker frame; and

an attachment piece extending radially outwardly from said speaker frame;

and said coupler terminal unit comprising:

a housing portion having four perpendicular upstanding side walls and a bottom wall for defining an internal space;

an eyelet member positioned at the internal space for fixedly connecting the housing portion to the attachment piece; and



a pair of terminal pieces, situated such that one terminal piece extends outward from a sidewall of the housing portion which sidewall is parallel to the extending direction of said attachment piece, and the other terminal piece extends outward from another sidewall of the housing portion which sidewall is also parallel to the extending direction of said attachment piece.

4,966,559

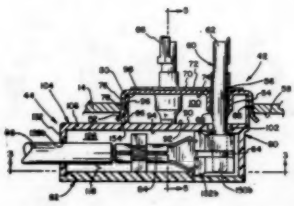
INTERNAL TERMINAL BLOCK FOR COMPRESSOR HERMETIC TERMINAL

Ronald R. Wisner, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Oct. 12, 1989, Ser. No. 420,380

Int. Cl.[5] H01R *21/02*

U.S. Cl. 439—566 **20 Claims**



1. A hermetic compressor, comprising:

a housing having an opening therein;

an electric motor operatively disposed within said housing;

hermetic terminal means for carrying electric current into the interior of said housing, said terminal means including a cup-shaped body member having a bottom wall and a generally cylindrical side wall extending upwardly therefrom to form an open end of said body member, and a plurality of conductor pins passing through said bottom wall of said body member, said body member being disposed in said opening of said housing such that said open end of said body member is exposed to the interior of said housing; and

terminal block means for electrically connecting said motor to said plurality of conductor pins, said terminal block means including shield means for substantially isolating said open end of said body member from the interior of said housing, said shield means including an outwardly facing cylindrical surface in contacting engagement with an inwardly facing cylindrical surface of said cylindrical

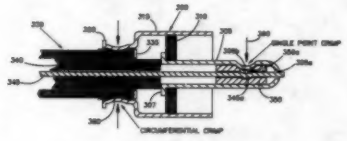
side wall of said body member to establish an annular sealing interface therebetween.

4,966,560

COAXIAL CONNECTOR PLUG USING A CENTER CONDUCTOR SLEEVE AND SINGLE POINT CRIMPING

Fred Marzouk, Nashua, N.H., assignor to Calcomp Inc., Anaheim, Calif.

Filed Sep. 7, 1989, Ser. No. 404,197
Int. Cl.[5] H01R 17/18
U.S. Cl. 439—585 6 Claims



1. In a coaxial connector plug having a hollow cylindrical center pin inside a cylindrical conductive housing concentrically disposed about the center pin with an insulating support separating the pin and the housing, an improved method for connecting the plug to a coaxial cable having a center conductor inside a hollow conductive shield and separated therefrom by an insulating layer in which a leading portion of the center conductor is exposed and wherein the cable is inserted into the plug so as to insert the leading portion of the center conductor inside the hollow center pin, the method comprising the steps of:

(a) sliding a hollow cylindrical conductive sleeve over the leading portion of the center conductor after the leading portion has been exposed, wherein one end of the hollow cylindrical center pin is disposed inside the housing and has an annular rear flange around an axial opening therein through which the center conductor is inserted and wherein the other end of the center pin comprises a closed tip having an opening therein;

(b) inserting the cable into the plug so as to insert the center conductor and the conductive sleeve into the hollow center pin by inserting the cable through the cable-receiving portion until a leading edge of the insulating layer of the cable abuts the annular rear flange of the center pin so as to insert a tip of the leading portion of the center conductor adjacent the opening in the tip of the center pin;

(c) staking the center pin at a single point so as to crimp the center pin, the sleeve and the center conductor together by deforming them in a single direction; wherein the conductive housing of the plug comprises a hollow cylindrical main portion at least partially surrounding the center pin with the hollow cylindrical cable-receiving portion concentric with the main portion and surrounding a leading portion of the shield and additionally comprising,

(d) exposing a trailing portion of the conductive shield;

(e) inserting the exposed trailing portion into a rear cable-receiving portion of the housing; and,

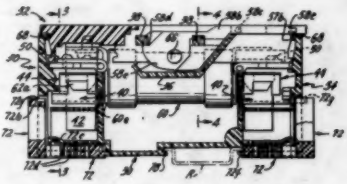
(f) circumferentially crimping the cable-receiving portion and the shield together so as to bend opposing parts of the cable-receiving portion and of the shield towards one another in opposing directions whereby to crimp the rear cable-receiving portion of the housing and the conductive shield together.

4,966,561

FUSE HOLDERS

Alexander R. Norden, New York, N.Y., assignor to Connectron, Inc., Laurence Harbor, N.J.

Filed May 31, 1989, Ser. No. 359,130
Int. Cl.[5] H01R 13/66
U.S. Cl. 439—622 18 Claims



1. A fuse holder including a fuse-carrier unit for receiving and retaining at least one cartridge fuse, said fuse-carrier unit having a fuse-carrier body of molded insulation and bearing a pair of widely spaced-apart fuse-carrier contacts, each said fuse-carrier contact being one of (a) a contact that forms part of the fuse-carrier unit and (b) a terminal of a cartridge fuse when received by the fuse-carrier unit, a receptacle unit including a receptacle body of molded insulation having a cavity for receiving said fuse-carrier unit and having a pair of widely spaced-apart receptacle contacts companion to said fuse-carrier contacts for tight engagement with the latter, and means for releasing the fuse carrier from the receptacle, said releasing means including a manually actuated device carried by one of said units and being arranged to act on both of said units oppositely for developing manual force-multiplied effort for driving said units away from each other and for forcing the disengagement of at least one of said fuse-carrier contacts from its companion receptacle contact.

4,966,562

SINGLE SLOT REPEATER MOUNTING

Loren M. Marshall, Dayton, and William A. Wolfe, West Milton, both of Ohio, assignors to The Ohio Bell Telephone Company, Cleveland, Ohio

Filed Sep. 6, 1988, Ser. No. 240,964
Int. Cl.[5] H01R 9/22
U.S. Cl. 439—718 12 Claims

1. An assembly comprising at least two communication line repeater mounting devices, each said communication line repeater mounting device comprising housing means for housing a communication line repeater, said housing means including a base and a front cover, cover fastener means for removably attaching said cover to said base, and electrical means in said housing means for electrically connecting the communicatiion

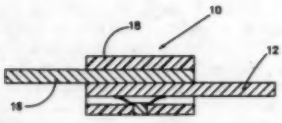
line repeater to signal wires; first base fastener means for attaching the base of a first one of said mounting devices to a support independently of said cover fastener means, and second base fastener means for fastening the base of a second one of said mounting devices to the cover of said first one of said mounting devices independently of said cover fastener means and said first base fastener means, wherby the cover of said first one of said mounting devices is removable from the base of said first one of said mounting devices while said base of said first one of said mounting devices remains fastened to the support and the base of said second one of said mounting devices remains fastened to the cover of said first one of said mounting devices.

4,966,563

BUS BAR TAB CONNECTOR

Michael L. Pierce, Scottsdale, and Scott J. Raffles, Chandler, both of Ariz., assignors to Rogers Corporation, Rogers, Conn.

Filed Apr. 11, 1989, Ser. No. 336,762
Int. Cl.[5] H01R *4/48*
U.S. Cl. 439—729 **6 Claims**



1. A bus bar connector for electrically connecting a first flat conductive tab to a second flat conductive tab, comprising:

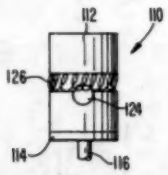
insulative housing means, said housing means having a first inner surface and an opposite second inner surface, for slidably receiving said flat tabs in overlapping contact with each other between the first and second inner surfaces; and conical disc spring means, disposed on said first inner surface, for compressing overlapping first and second tabs between the spring means and the second inner surface to electrically connect the overlapping tabs.

4,966,564

ELECTRICAL CONNECTOR BETWEEN ELECTRODE LEADS AND PACEMAKER TERMINAL

Roger M. L. Foote, Eastwood, Australia, assignor to Telectronics, N.V., Netherlands Antilles

Filed Sep. 9, 1988, Ser. No. 242,349
Int. Cl.[5] H01R *13/33*
U.S. Cl. 439—840 **19 Claims**



1. A terminal assembly for an implantable heart pacemaker device for connection to an electrode lead, comprising:

a conductive terminal body having a first transverse passageway for receiving the electrode lead and a second transverse passageway extending completely through said body and intersecting the first passageway; and

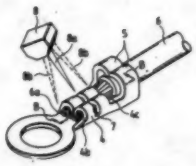
canted coiled spring means disposed within the second passageway for tangentially engaging the electrode lead upon insertion into the first passageway, said spring means having ends which protrude at both ends of the second passageway and are secured to the outer surface of said terminal body.

4,966,565

CRIMP-STYLE TERMINAL AND METHOD OF CONNECTING CRIMP-STYLE TERMINAL AND ELECTRIC CABLE TOGETHER

Hikoo Dohi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 417,224
Claims priority, application Japan, Oct. 13, 1988, 62-255945
Int. Cl.[5] H01R *4/02*
U.S. Cl. 439—874 **9 Claims**



1. A crimp-style terminal comprising:

cable clamping means for clamping a conductor wire, said cable clamping means including a conductor clamping portion, a base that is integrally formed with said conductor clamping portion, said conductor clamping portion comprising at least one pair of press-deformable arms substantially perpendicularly formed respectively on lateral edges of said base, and an opening extending through each of said press-deformable arms for fusing an exposed portion of said conductor wire; and

an electric connective portion extended from said base.

4,966,566

RAISING AND LOWERING AID FOR TROLLING MOTORS

John S. Baird, 9600 Baird Rd., Shreveport, La. 71118

Filed Sep. 1, 1988, Ser. No. 239,222
Int. Cl.[5] B63H *21/26*
U.S. Cl. 440—6 **25 Claims**

1. A raising and lowering aid adapted for attachment to a trolling motor mount, said mount having a fixed portion and a movable portion pivotally attached to the fixed portion, said raising and lowering aid comprising essentially three elements hinged together in triangular relationship, with a first one of said elements comprising foot means pivotally attached at one end to the trolling motor mount, a second one of said elements comprising resilient means pivotally attached at one end to said

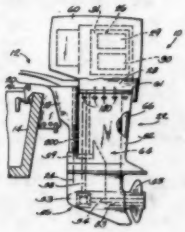
foot means and the third of said elements comprising connecting means having one end pivotally attached to said foot means and the opposite end pivotally attached to said resilient means so that the movement of the movable portion of the trolling motor mount from a retracted position to an operating position causes said foot means to pivot with respect to the fixed portion of the trolling motor mount and said three elements to pivot cooperatively against the bias of said resilient means, whereby said raising and lowering aid provides resistance to the downward movement of the movable portion of the trolling motor mount from an intermediate position into the operating position and an upward force on said movable portion from the operating position back to the intermediate position.

4,966,567

MARINE PROPULSION DEVICE

Paul W. Breckenfeld, Kenosha, Wis., and George L. Broughton, Zion, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Feb. 27, 1989, Ser. No. 316,417
Int. Cl.[5] B63H *21/26*
U.S. Cl. 440—89 **5 Claims**



1. A marine propulsion device comprising an internal combustion engine including an engine block comprising a cylinder, a lower face on said engine block, an exhaust outlet port in said lower face, an idle exhaust inlet port in said lower face, an idle exhaust outlet port adapted to communicate with the atmosphere, and an idle exhaust passage communicating between said idle exhaust inlet port and said idle exhaust outlet port, a drive shaft housing having an upper end face, a propeller shaft rotatably supported by said drive shaft housing and adapted to support a propeller, a drive shaft extending through said drive shaft housing and including an upper end driven by said engine and a lower end drivingly connected to said propeller shaft, an exhaust housing located at least partially within said drive shaft housing and including a flange extending between said lower face of said engine block and said upper end face of said drive shaft housing, a main exhaust passage communicating with said exhaust outlet port, idle exhaust passage means communicating between said main exhaust passage and said idle exhaust inlet port, and fastening means for connecting said upper end face of said drive shaft housing to said lower face of said engine block with said flange therebetween.

4,966,568

COVERED BALLOON

Akira Nakamura, Yokohama, and Junichi Matsuzawa, Tokyo, both of Japan, assignors to Takara Kosan Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1989, Ser. No. 430,362
Claims priority, application Japan, Nov. 4, 1988, 63-144688[U]
Int. Cl.[5] A63H *3/06*
U.S. Cl. 446—221 **8 Claims**

1. A covered balloon, comprising:

a cover having an first nozzle, formed of two sheets of plastic film superposed on one another and having peripheral edges welded together to form a seam, except at the first nozzle, to surround an interior space, said plastic film being substantially gas impervious and being deformable; and

a rubber balloon having a second nozzle and an external surface, said rubber balloon being disposed in said interior

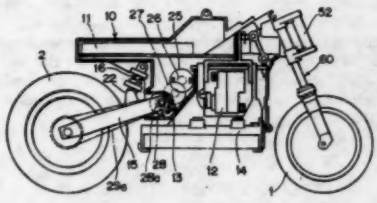
space, surrounded by said cover, said rubber balloon being inflated so as to fill said interior space, said external surface attaching to an interior surface of said cover, said interior surface surrounding said interior space, said second nozzle protruding from said interior space through said second nozzle.

4,966,569

RADIO CONTROLLED TWO-WHEELED VEHICLE TOY

Kiyoji Asano, Tochgi, Japan, assignor to Green Corporation, Tochigi, Japan

Filed Jun. 2, 1989, Ser. No. 360,785
Claims priority, application Japan, Feb. 1, 1989, 1-9831
Int. Cl.[5] A63H *17/16*
U.S. Cl. 446—440 **4 Claims**



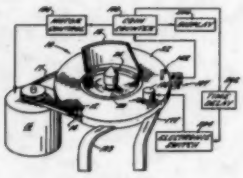
1. A radio-controlled two-wheeled toy vehicle comprising a body; front and rear wheels; a drive mechanism for the rear wheel; a support for the front wheel; a battery case arranged in a lower part of the toy vehicle body; means for pivoting said battery case right and left with respect to a direction of movement of the vehicle in response to a signal from radio control means to provide for the toy vehicle steering to the right and left, respectively; means for connecting said battery case to said support for the front wheel for enabling inclination of said support for the front wheel and said front wheel to the right and left in accordance with swinging of said battery case to the right and left, respectively; and a driver element mounted on seat of the toy vehicle and having balance weights arranged within said driver element swingable right and left with respect to a direction of movement of the toy vehicle to accelerate inclination of the toy vehicle body in a respective direction to thereby enable a rapid change of the direction of movement of the toy vehicle; said connecting means including clutch means for connecting said battery case and said support for the front wheel, and means for disabling said clutch means in response to an excess load acting thereon.

4,966,570

COIN SORTING APPARATUS FOR SORTING COINS OF SELECTED DENOMINATIONS

Victor G. Ristvedt, Box 8904, Rte. 8, and Mark E. Ristvedt, 1000 Woodland Ct., both of Manchester, Tenn. 37355

Filed Jul. 30, 1987, Ser. No. 79,683
Int. Cl.[5] G07D 3/00, 3/16
U.S. Cl. 453—6 21 Claims



1. A coin sorting apparatus for receiving and sorting mixed coins by denomination, said apparatus comprising:

a rotatable disc having a resilient surface for receiving said mixed denomination coins and imparting rotational movement to said coins,

a stationary guide plate having a contoured surface spaced slightly away from and generally parallel to said resilient surface of said rotatable disc, said stationary guide plate including means for locating the innermost edges of said coins at a first preselected radial position where the radially outer portions of said coins extend outwardly beyond the outer periphery of said guide plate while the radially inner portions of said coins are pressed into said resilient surface to hold the coins between said guide plate and said rotatable disc,

means for engaging said radially outer portions of at least one selected denomination of said coins and radially relocating coins of said selected denomination with their innermost edges at a second preselected radial position so that the innermost edges of coins of different denominations are located at different radial positions, and

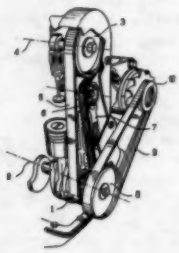
means for discharging coins of different denominations at different circumferential locations around the periphery of said guide plate, said circumferential locations being determined by the radial locations of the innermost edges of the coins.

4,966,571

INTERNAL COMBUSTION ENGINE

Hubert de Guillebon, Decize, France, assignor to Casutchouc Manufacture et Plastiques, Versailles, France

Filed Oct. 5, 1989, Ser. No. 417,522
Claims priority, application France, Oct. 5, 1988, 88 13147
Int. Cl.[5] F16H 7/08
U.S. Cl. 474—111 26 Claims



1. An internal combustion engine comprising:

mechanical power generation means having an operating system for generating mechanical power;

first wheel means for being connected to and receiving mechanical power from said mechanical power generation means;

second wheel means positioned at a spaced-apart distance from said first wheel means, said second wheel means being connected to and for receiving at least a portion of said mechanical power from said operating system;

belt means having a surface, said belt means being connected between said first wheel means and said second wheel means for transferring mechanical power from said first wheel means to said second wheel means; and

belt tension adjusting means for being in contact with said surface of said belt means for adjusting the tension of said belt means by applying a controlled amount of force to said surface of said belt means;

said belt tension adjusting means comprising:

force application means for being in contact with said surface of said belt means for applying said controlled amount of force to said surface of said belt means,

support means relatively movable in directions toward and away from said surface of said belt means to adjust said controlled amount of force, and

support moving means having a changeable length for being mechanically connected to said support means for moving said support means in directions toward and away from said surface of said belt means when said length of said support moving means changes;

said support moving means having a preselected temperature expansion coefficient to change said length of said support moving means relative to at least one temperature or a range of operating temperatures of said engine, and

said force application means, said support means and said support moving means each being relatively sized and each being relatively positioned with respect to said surface of said belt means; said preselected temperature expansion coefficient being selected for causing said controlled amount of force to be applied to said surface of said belt means relative to at least one temperature or a range of temperatures, whereby said belt tension adjusting means adjusts the tension of said belt means when a change in said temperatures causes said spaced-apart distance between said first wheel means and said second wheel means to change.

4,966,572

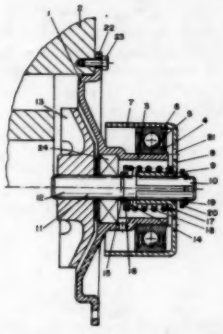
DRIVE AND BEARING FOR WATER PUMP

Heinrich Kunkel, and Armin Olschewski, both of Schweinfurt, Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 27, 1989, Ser. No. 385,716
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825633
Int. Cl.[5] F16H 55/36
U.S. Cl. 474—199 14 Claims

1. In a water pump having a water pump housing, a housing flange mounted on the water pump housing, a pump rotor rotatably journaled in the housing and a hollow stud projecting axially outwardly from the flange, a drive and bearing assembly for supporting the pump rotor comprising a roller bearing (5) supported on the outer peripheral surface of the hollow stud, a pulley rotatably supported by said roller bearing on the hollow stud of the housing flange, a shaft supporting the pump

rotor and passing through the hollow stud and a coupling element connecting said pulley to the shaft in a torsion-proof



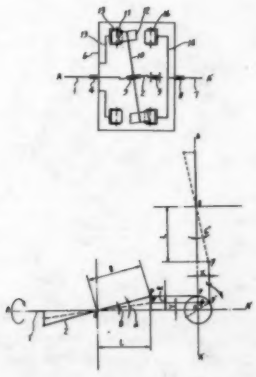
manner and simultaneously centering the shaft whereby the roller bearing (5) is tightened to eliminate axial play.

4,966,573

DIFFERENTIAL SPEED REDUCTION APPARATUS AND DOUBLE-TOOTHED GEAR FOR USE THEREIN

Takao Yokoi, Nabarishi, Japan, assignor to Kabushiki Kaisha Shinkoseisakusho, Osaka, Japan

Filed Mar. 3, 1989, Ser. No. 318,250
Claims priority, application Japan, Mar. 10, 1988, 63-56984
Int. Cl.[5] F16H *1/28*
U.S. Cl. 475—164 **2 Claims**



1. A differential speed reduction apparatus, comprising a double-toothed gear including face cams at opposite sides, each face cam having a tooth profile generated s as to be adapted for use in the differential speed reduction apparatus including an input shaft carrying the double-toothed gear, a slant shaft rotatively connected to the input shaft such that the slant shaft wobbles in associated with the rotation of the input shaft, a stationary face gear engageable with the face cams of the double-toothed gear, a movable face gear secured to an output shaft, wherein the stationary face gear secured to an output shaft, wherein the stationary face gear and the movable face gear have one of a roller-like or a convex-face contour, and wherein the face cams of the double-toothed gear have a profile which satisfies the following equations:

$$B=\tan^{-1}(\cos\Theta\cdot\tan\alpha),$$

$$C=\tan^{-1}(\sin\Theta\cdot\tan\alpha), \text{ and}$$

$$\Delta A=D\cdot\Theta/N,$$

where:

α=an angle at which the slant shaft is inclined with respect to an axis A—A′ of the input shaft;

θ=an angle at which the input shaft rotates about the axis A—A′;

B°, C°=angles of the face cams obtainable from α and Θ;

$\Delta A=D\cdot\Theta/N$;

D=a gear ratio in a mating face cam and face gear; and

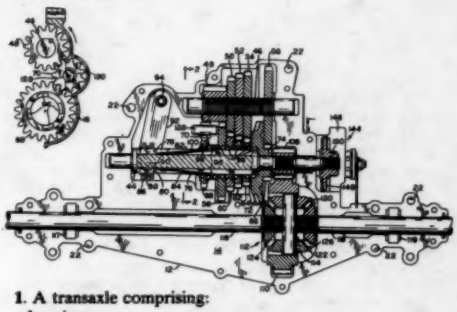
N=a number of teeth of each face cam.

4,966,574

TRANSAXLE

Roland L. von Kaler, and Rocky H. Page, both of Tecumseh, Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Jun. 6, 1989, Ser. No. 362,343
Int. Cl.[5] F16H *37/08*
U.S. Cl. 475—206 **16 Claims**



1. A transaxle comprising:

a housing;

a shift shaft rotatably mounted in said housing, said shift shaft having a first portion and a second portion wherein said first portion is of greater diameter than said second portion, said shift shaft having an output spur gear affixed to and rotatable with said shift shaft;

a plurality of adjacent speed change spur gears journalled for free rotation on the first portion of said shift shaft;

a drive gear integrally conjoined with a speed change gear, said drive gear being journalled for free rotation at least in part on the first portion of said shift shaft and said integrally conjoined speed change gear being journalled for free rotation on the second portion of said shift shaft, such that said drive gear is disposed axially intermediate said integrally conjoined speed change gear and said plurality of adjacent speed change spur gears;

shift means rotatable with said shift shaft and axially movable on the first portion of said shift shaft for selectively coupling each of said plurality of speed change spur gears and said drive gear one at a time to said shift shaft to effect rotation in unison therewith;

a counter shaft rotatably mounted in said housing parallel to said shift shaft;

a plurality of companion spur gears affixed to and rotatable in unison with said counter shaft, each of said companion spur gears being in constant running mesh with at least one of said plurality of adjacent speed change gears and said integrally conjoined speed change gear;

a differential gear assembly mounted in said housing and being in constant running mesh with the output spur gear of said shift shaft; and

a pair of output drive shafts rotatably mounted in said housing and driven by said differential gear assembly.

4,966,575

AUTOMATIC STEPLESS TRANSMISSION APPARATUS AND METHOD THEREOF

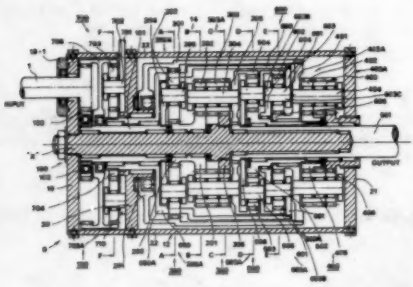
Jun Y. Lim, Duckjong Villa Ka-204, Duckjong-Ri Hoecheon-Eup, Yangju-Kun, Kyungki-do, and Jong O. Na, 24-1,265-154, Bokwang-Dong, Yongsan-ku, Seoul, both of Rep. of Korea

Filed May 5, 1989, Ser. No. 347,916

Claims priority, application Rep. of Korea, Sep. 13, 1988, 11782/88[U]

Int. Cl.[5] F16H *3/74, 3/62*

U.S. Cl. 475—257 11 Claims



1. An automatic transmission apparatus for an automatic and stepless change in the rotational speed of an output shaft in response to a variation in a load imposed on the output shaft and in further response to a change in rotational input power delivered to an input shaft, comprising:

a load detecting gear set communicating with the input shaft and the output shaft for detecting a change in rotational phase which varies according to a change in rotational power delivered to the input shaft;

said load detecting gear set providing in use rotational output which is rotatably connected to a rotational shaft;

a low speed power line for generating a low gear variation ratio rotational output;

a high speed power line for generating a high gear variation ratio rotational output;

a distribution gear assembly rotatably connected to said rotational shaft for distributing the input rotational power delivered through said load detecting gear set into said low speed power line and said high speed power line;

a reduction gear assembly of said high speed power line rotatably connected to said distribution gear assembly for reducing the rotational speed of said high speed power line and generating a reduced rotational speed output;

an acceleration gear assembly of said low speed power line rotatably connected to said distribution gear assembly for increasing the rotational speed of said low speed power line and generating an increased rotational speed output;

a combination gear assembly rotatably connected thereto for combining said reduced rotational output power of said high speed power line and said increased rotational output power of said low speed power line, and transmitting a combined rotational power to the output shaft;

said combination gear assembly including:

a sun gear rotatably mounted on the output shaft to enable rotation thereof independently of the output shaft and mechanically communicating with said low speed power line to receive rotational force therefrom;

a plurality of planetary gears with each planetary gear mechanically communicating with said sun gear;

a planetary gear carrier for rotatably securing each planetary gear of said plurality of planetary gears to enable mechanical communication of each planetary gear with said sun gear and mechanical communication with the output shaft to transmit rotational force thereto; and

a ring gear mechanically communicating with each planetary gear of said plurality of planetary gears and mechanically communicating with said high speed power line to receive rotational force therefrom, and

a rotational adjustment means rotatably connected to the output shaft, the input shaft and said low speed power line, such that in the rotational force of said low speed power line is brought in balance with the rotational force of said high speed power line by varying the rotational resistance on said low speed power line in response to a difference in phase between the input shaft and the output shaft detected by said load detecting gear set thereby automatically adjusting a variation ratio from 0 to more than 1 to comply with the conditions of the input rotational power and the load imposed on the output shaft.

4,966,576

CONTINUOUSLY OPERATING CENTRIFUGE DRUM

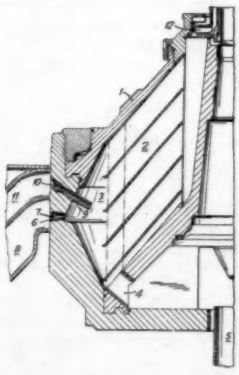
Dieter Schulz, Oelde; Ulrich Wrede, Ennigerloh-Ostenfelde, and Wilfried Mackel, Oelde, all of Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Continuation of Ser. No. 51,975, May 18, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 415,393

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1986, 3619298

Int. Cl.[5] B04B *11/00*

U.S. Cl. 494—56 9 Claims



1. In a continuously operating centrifuge drum for concentrating suspended solids, having a first skimmer for directing clarified liquid from the drum and wherein the solids precipitate in a stack of disks and accumulate in a solids space and are diverted into a first receiving chamber through continuously dischargeable primary mouthpieces that contain throttle bores that communicate with an outer periphery of the solids space, the improvement comprising continuously dischargeable secondary mouthpieces including throttle bores that communicate with a radially inner zone of the solids space relative to the primary mouthpieces to discharge solids overflow which cannot be discharged by the primary mouthpieces, and a second receiving chamber disposed outside the solids space and receptive of solids diverted by the secondary mouthpieces, wherein the throttle bores in the primary mouthpieces have an overall cross section which is dimensioned to allow only a portion of the solids separated in the drum to be diverted therethrough, whereby a solid stream with a relatively high solid concentration is received in the first receiving chamber and a solid stream with a relatively low solid concentration is received in the second receiving chamber.

4,966,577

PREVENTION OF LENS-RELATED TISSUE GROWTH IN THE EYE

Craig E. Crosson, The Woodlands, Tex.; Beverly E. Barton, West Orange, N.J.; William H. Garner, Corona Del Mar, and Arlene E. Gwon, Newport Beach, both of Calif., assignors to Allergan, Inc., Irvine, Calif.

Filed Mar. 16, 1988, Ser. No. 168,697

Int. Cl.[5] A61N *1/30*; A61M *31/00*

U.S. Cl. 604—20 29 Claims

1. A method for preventing tissue growth in the eye following removal of the natural lens, comprising the steps of:

providing an antibody specific to proliferative cells in the lens capsular bag and anterior chamber, but not to other eye tissue, wherein said antibody is conjugated to an antiproliferative agent, wherein said antiproliferative agent requires activation in order to prevent proliferation of cells bound by said antibody conjugate;

introducing said antibody into the lens capsular bag or anterior chamber of the eye after removal of the natural lens from the eye;

permitting said antibody conjugate to bind to proliferative cells in the lens capsular bag or anterior chamber; and

activating said proliferative agent after binding said cells to prevent proliferation of said bound cells.

4,966,578

APPARATUS FOR THE INSUFFLATION OF GAS INTO A BODY CAVITY

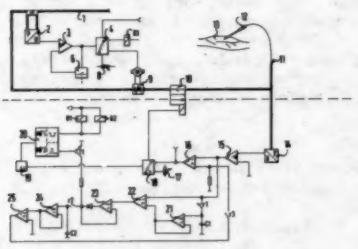
Manfred Baier, and Roland Schäfer, both of Bretten-Diedelsheim, Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 201,936

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718717

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—26 9 Claims



1. An apparatus for the insufflation of gas into a body cavity, said apparatus including means for detecting a dynamic pressure of the gas flow conducted tot he body cavity and a static intra-abdominal pressure in the body cavity, said means including measuring transducer means for producing an electrical output signal, means for converting the electrical output signal by a difference formation with a compensation signal, which substantially takes into account the resistance to flow of an instrument for conducting the gas into the body cavity, into a difference signal which corresponds to the static intra-abdominal pressure, and control circuit means for the adjusting of the desired pressure value in the body cavity in response to said difference signal, the improvements comprising first means for generating the compensation signal in each case at the start of the insufflation from the output signal of the measuring transducer means and storing the compensation signal in a first store, a first switch interposed between said first store and said transducer means, and when gas flows said first means feeding the stored compensation signal to one input of a first operational amplifier and as the output signal of the measuring transducer means is being fed to the other input of the first operational amplifier for the formation of the difference signal, whilst said first switch is opened to electrically separate an input side of the first store from the measuring transducer means.

4,966,579

APPARATUS FOR DOSED CONTINUOUS SIMULTANEOUS INFUSION OF A PLURALITY OF INFUSION SOLUTIONS OR MEDICAMENTS

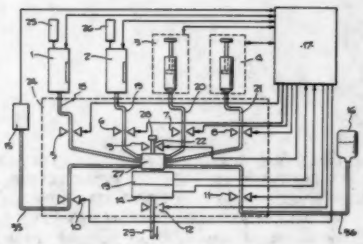
Hans-Dietrich Polaschegg, Oberursel, Fed. Rep. of Germany, assignor to Fresenius AG, Bad Homburg, Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 355,151

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817411

Int. Cl.[5] A61M *31/00*

U.S. Cl. 604—65 9 Claims



1. Apparatus for dosed continuous simultaneous infusion of a plurality of infusion or medicaments solutions comprising at least one pump, delivery conduits which lead from containers containing the infusion or medicaments solutions and are connected via a junction piece to a common patient conduit, valve which are provided in each delivery conduit, a flow sensor detecting the flow in the patient conduit and a control unit which is operatively connected to the valves, the pump and the flow sensor, characterized in that the flow sensor (14) is arranged downstream of the pump (1–4) and that the control unit (17) causes the valves (5–8) to close on detection of a fluid stop by the flow sensor.

4,966,580

ORAL FEEDING APPLIANCE

John J. Turner, and Mary J. A. Turner, both of Liverpool, England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 191,180, May 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 79,775, Jun. 29, 1987, Pat. No. 4,813,933. This application Jul. 19, 1989, Ser. No. 382,021

Claims priority, application United Kingdom, Oct. 29, 1985, 8526631; Jan. 16, 1986, 8600988

Int. Cl.[5] A61M *31/00*

U.S. Cl. 604—67 12 Claims

1. Apparatus for administering ingestible oral fluid to a patient comprising:

a nipple;

means for holding the nipple in the patient's mouth;

a container for the oral fluid;

a tube lelading from the container to the nipple; and

metering means responsive to patient action on the nipple to initiate fluid flow out of the nipple, said metering means

acting to continue said flow in a predetermined manner independent of continuous patient action.

4,966,581

NON REUSABLE DISPOSABLE CAPSULE CONTAINING AN INDIVIDUAL VACCINE DOSE TO BE HYPODERMICALLY INJECTED WITH A PRESSURE NEEDLELESS INJECTION APPARATUS

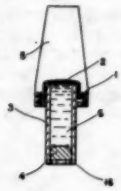
Sergio Landau, Rio de Janeiro, Brazil, assignor to Vitajet Industria E. Commercio Ltda, Rio de Janeiro, Brazil

Filed Aug. 5, 1988, Ser. No. 229,566

Claims priority, application Brazil, Apr. 22, 1988, PI1880195-2[U]

Int. Cl.[5] A61M *5/30*

U.S. Cl. 604—72 **16 Claims**



1. A disposable capsule for a needleless hypodermic injection device comprising:

a hollow body having an open front end and a rear end that is closed by a bottom wall that is attached to the body by an outwardly extending flange having a smaller thickness than a remaining portion of the bottom wall, said body is connectable to said hypodermic injection device so that a piston can engage the bottom wall and detach said flange from said body;

a nozzle, attached to the front end of the body, having a minute front orifice through which a liquid to be injected can expelled in the form of a jet; and

a sealing disc within said body so as to prevent the liquid within the body from leaking out the rear end, said disc is moveable from a first position at the rear end of the body to a second position at the front end of the body so that the liquid to be injected can be expelled out said orifice, said disc immediately moves when said piston detaches the flange and moves the bottom wall toward the front end.

4,966,582

INJECTION SITE PLATFORM

James K. Sit, 120 Barrypoint Rd., and William C. Miller, 100 Fairbank Rd., both of Riverside, Ill. 60546

Filed Jun. 30, 1989, Ser. No. 374,661

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—86 **11 Claims**

1. An injection site platform for use in adding a needle injected medication to a parenteral fluid being provided to a patient, said platform including a base, an outlet port of a size and shape to receive a needle-pierceable releasable diaphragm, said outlet port having a plurality of inwardly-radially extending projections on the interior thereof so that said outlet port may compressively receive injection port caps having resealable diaphragms of slightly differing size and/or shape, a conical wall with the smaller diameter portion thereof being joined with said outlet and the larger diameter portion thereof being connected to and terminating at said base, whereby said conical wall provides a needle guide to the diaphragm positioned in said outlet and an access for the application of an antiseptic wipe to the diaphragm, a portion of said platform having an opening for use with a tube carrying parenteral fluid, whereby such tube may be manually constricted by pressing the tube against the platform adjacent the opening.

4,966,583

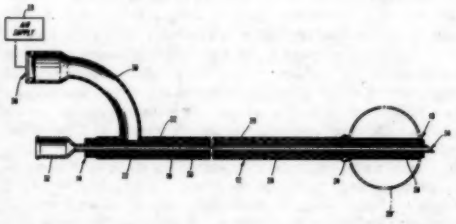
APPARATUS FOR LOCATING A BREAST MASS

Elie Debbas, 800 Southern Ave., SE #407, Washington, D.C. 20032

Filed Feb. 3, 1989, Ser. No. 305,965

Int. Cl.[5] A61M *29/02*

U.S. Cl. 604—98 **8 Claims**



1. An apparatus for localizing and palpating a mass in body tissue, said apparatus comprising:

a flexible catheter having an open proximal end and an open distal end;

an external sheathing surrounding said catheter and including an expandable balloon portion positioned at a distalmost portion of said distal end of said catheter, said bal-

loon portion being expandable around said catheter at said distalmost portion of said catheter and being inflatable to have a diameter of about 2 to 5 cm at a mass located deeply in the body tissue so as to be palpable through the body tissue so that a direct incision may be made from the skin to the expanded balloon portion across the shortest distance possible for surgically locating the mass with a minimal length incision; and

a hollow needle having proximal and distal ends, said distal end being sharp, said needle being insertable through said proximal end of said catheter so that said distal end of said needle extends beyond said distal end of said catheter to deliver anaesthesia to an area adjacent to an x-ray identified mass so that said balloon may be inflated under anesthetized conditions to identify the location of the mass by feeling the location of the inflated balloon portion through the body tissue, with means for preventing the distal end of said needle from extending more than slightly beyond said distal end of said catheter.

4,966,584

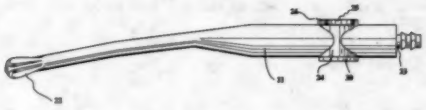
SUCTION ASPIRATOR WITH NOISE-CONTROL VALVE

Long P. Nguyen, 1908 S. Church, Brenham, Tex. 77833

Continuation-in-part of Ser. No. 854,551, Apr. 21, 1986, abandoned. This application Mar. 7, 1988, Ser. No. 165,126

Int. Cl.[5] A61M *31/00*

U.S. Cl. 604—119 **1 Claim**



1. In combination with a flexible conduit adapted to be connected to a vacuum source for inducing a flow therethrough, a noise control valve device for controlling suctioning of liquids from a human body cavity, said valve controlled suction device improvement comprising a tubular elongated suction passage having a bore bisecting said suction passage, a cylindrical, hollow adaptor body positioned within said bisecting bore adapted to receive a rotatable valve plug member, said adaptor body having open and closed ends with a flange around the open end thereof, said flange having a cut out portion or recess thereon to limit rotary movement of the said valve member, said adaptor body further having inlet and outlet parts aligned with said suction passage, a rotatable valve plug member recited within said adaptor hollow body having a valve passage therein for alignment or misalignment with said adaptor parts, said valve body having a knob means thereon engaging within said flange cut out for limiting rotary movement thereof, so that rotary movement of the valve member alternately aligns or misaligns the valve passage with the suction passage to either open to unrestricted suction at one limit or restrict the suction completely at the other limit to effectively eliminate suction noise, whereby the improvement allows the operator to employ the suction device by himself with only one hand holding the suction device by its handle while using the thumb of finger of the one hand to operate the suction on/off by just moving said knob means within the flange cut out limit so that the other hand of the operator is free for a different task, said valve device being non-vented to the atmosphere in any position of the valve.

4,966,585

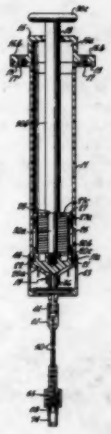
INFUSION APPARATUS

Ronald J. Gangemi, 10607 Barmer Mine Way, Nevada City, Calif. 95959

Filed May 31, 1988, Ser. No. 200,231

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—131 **45 Claims**



1. Infusion apparatus for enabling administration of solution to a patient at a controlled flow rate, said apparatus comprising:

syringe means having bore means configured for receiving solution therein and aperture means adjacent an end thereof, said syringe means including piston means movable within said bore means and defining a solution receiving chamber intermediate said piston means and said aperture means;

separable handle means configured for coacting engagement with said piston means, said handle means, when coactingly engaging said piston means enabling manual operation of said syringe means for drawing solution into said chamber through said aperture means;

power means within said bore means intermediate said piston means and the end of said bore means opposite said aperture means, said power means and said handle means being configured for storing energy in said power means on coacting engagement of said handle means with said piston means, and for releasing of the energy upon separation of said handle means from said piston means;

solution administration means, including solution flow means, at least one of said aperture means and said solution flow means including flow restricting means for controlling the rate of flow of solution therethrough; and

means for coupling said administration means to said syringe means in fluid flow relation with said aperture means for enabling controllable flow of solution from said chamber through said solution flow means under force of said power means with said handle means separated from said piston means.

4,966,586

CLOSED SYSTEM OVER-THE-NEEDLE I.V. CATHETER

Vincent L. Vaillancourt, 14 Bunyan Dr., Livingston, N.J. 07039

Continuation of Ser. No. 93,420, Sep. 4, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 453,043

Int. Cl.[5] A61M *5/178*

U.S. Cl. 604—164 **19 Claims**

1. A closed system over-the-needle I.V. catheter product which is attached to an I.V. fluid delivery means and primed

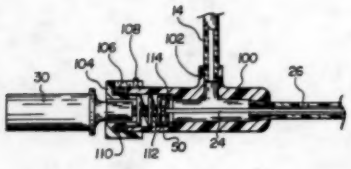
prior to puncture of a blood vessel and retention of said catheter in a patient, said I.V. catheter product including:

a catheter hub having an opening adapted to received fluid from an I.V. fluid supply, this opening being flow-connected to a longitudinal passage formed therein and with this catheter hub having a front end flow-connected to this passage an with this catheter hub having an open rear end;

a bacteria-retentive filter serially connected to said I.V. fluid delivery means, with said retained filter adapted to pass I.V. fluid and to exclude any bacteria present in said delivered fluid supply to said catheter hub;

a needle with holder attached thereto so that when and as the needle makes a puncture of a blood vessel in a patient, blood flows through the needle to the holder;

a flexible catheter positioned at the front end of the catheter hub and flow-connected to said longitudinal passage, said catheter having an entering end with a contour providing a tight fit to and on said needle, this catheter sized to



provide a small conducting passageway alongside the placed needle;

a small passage means provided at or near the distal end of the flexible catheter, this small flow-passage means providing for the expelling of air from a localized area at or in this contoured entering end, this expulsion occurring as fluid is advanced through the system; and

means arrayed at the open rear end of the catheter hub for closing this rear end and sealing off the needle passage as and when the needle is removed from the catheter and catheter hub said means includes forming said open rear end with an exterior male thread and with a shouldered recess in said end and utilizing a compressible, pierced resilient disc to close the passageway by the withdrawal of the needle and a washer arrayed on each side of the resilient disc and with the resilient disc further compressed as desired by rotative manipulation of a threaded cap having female threads configured to mate with the male threads formed on the catheter hub, said cap manipulated to.

4,966,587

MEDICAL INTROMISSION KIT

Rainer Baumgart, Athener Platz 11, 8000 Munich 90, Fed. Rep. of Germany

Filed Apr. 26, 1989, Ser. No. 343,271

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814618

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—164 **6 Claims**

1. A medical intromission device comprising:

an inner sleeve having a slightly conical, tapering distal end portion, wherein the distal end portion includes a shoulder having an outer diameter and said shoulder extends proximally from the distal end portion,

an intermediate sleeve coaxial with the inner sleeve, wherein the intermediate sleeve has a distal end for engaging with the shoulder of the distal end portion of the inner sleeve, said distal end of the intermediate sleeve having an outer diameter greater than or equal to the outer diameter of the shoulder of the distal end portion,

a flexible outer sleeve coaxial with the intermediate sleeve, said outer sleeve having a distal end with an outer diameter less than or equal to the outer diameter of the shoulder of the distal end portion of the inner sleeve and having a proximal end with a seal for occluding flow through the outer sleeve when the inner sleeve and intermediate sleeve are removed from the outer sleeve, and

wherein the inner and intermediate sleeves are removable from the outer sleeve by pushing the intermediate sleeve through the outer sleeve to widen the distal end of the outer sleeve and retracting the inner sleeve to engage the shoulder of the distal end portion with the intermediate sleeve before passing through the distal end of the outer sleeve and out through the seal of the proximal end of the outer sleeve.

4,966,588

DEVICE SUITABLE FOR THE ADMINISTRATION OF A THERAPEUTIC SUBSTANCE

Gerrard A. Rayman, Martlesham Heath, Nr. Ipswich; Harvey L. Sugarman, Colchester, and Ivan P. Harris, Clacton-on-Sea, all of England, assignors to H. G. Wallace Limited, Essex, England

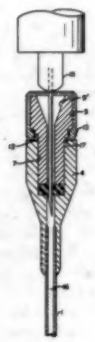
PCT No. PCT/GB87/00527, § 371 Date May 23, 1988, § 102(e) Date May 23, 1988, PCT Pub. No. WO88/00842, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 24, 1987, Ser. No. 170,383

Claims priority, application United Kingdom, Jul. 25, 1986, 8618253

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—165 **22 Claims**



1. A device suitable for use in the intermittent or even continuous administration of a therapeutic substance such as insulin, which device comprises:

a cannula of biocompatible plastics material for indwelling in a patient and defining a cannula through-passage;

a hub defining a hub through-passage; and

a separator means, the respective cannula and hub through-passages being isolatable from each other by said separator means, said separator means being disposed between the proximal end of the cannula and the proximal end of the hub and the hub being operatively connected with the cannula, the respective said through-passages and said separator means serving, in use, to permit a needle to

penetrate the hub and cannula through them and, when necessary, to extend beyond the distal end of the cannula, the through-passage of the hub also serving, in use, to guide an injection needle passed therethrough so that the needle thus guided will pass through the separator means at a position where the needle is aligned with the through-passage of the cannula;

said hub being a two-component hub assembly comprising a first hub component and a second hub component, and the separator means being located between the two components of the hub;

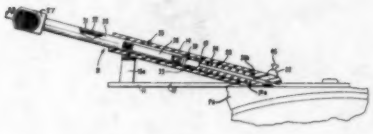
said first hub-component comprising a body defining an axial bore which at its distal end is adapted to receive the proximal end of the cannula, whereby the through-passage of the cannula is positioned in communication with the bore, and at its other end a socket communicating with the bore and adapted to receive a plug-portion of said second hub-component also comprising a body defining an axial bore, the bores in the respective first and second hub-components being aligned to communicate with each other and together defining said hub through-passage in the hub-assembly.

4,966,589

INTRAVENOUS CATHETER PLACEMENT DEVICE

Jerry M. Kaufman, Eatontown, N.J., assignor to Hemedix International, Inc., Eatontown, N.J.

Filed Nov. 14, 1988, Ser. No. 271,587
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—174 **8 Claims**



1. A Composite Catheter Assembly for inserting and removing an intravenous catheter including needle means in a fluid-carrying conduit of a patient comprising:

a. attachment means to be securely connected to the patient at the point where the fluid carrying conduit is located;

b. a barrel member pivotally connected to the attachment means having, an inner chamber for slidably accommodating said intravenous catheter whereby said needle means may be maintained in a retracted position entirely within said barrel member;

c. extending means for slidably moving said needle means from said retracted position entirely within said barrel member to an extended position into said fluid carrying conduit of said patent;

d. said barrel member pivotable in assembled position to fix the angular position of said barrel member, whereby said needle means can be accurately located in said fluid carrying conduit of said patient when slidably moved from said retracted position to said extended position by said extending means; and

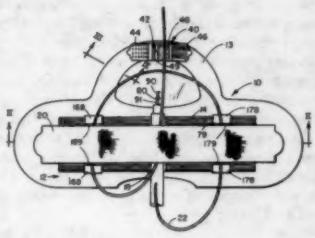
e. retraction means comprising a resilient assembly for operatively retracting and returning said needle means of said catheter into said barrel member rom said extended position to aid retracted position.

4,966,590

IV CLAMP WITH MEMBRANE DRESSING

Glenda G. Kalt, Boca Raton, Fla., assignor to Kalt Medical Corporation, Boca Raton, Fla.

Filed Dec. 13, 1988, Ser. No. 283,827
Int. Cl.[5] A61M *25/02*
U.S. Cl. 604—180 **40 Claims**



1. A clamp for holding an IV device, comprising:

base means having an arch portion defining a window opening;

membrane means covering said window opening and having a slot for allowing a needle for said IV device to puncture a patient's skin at a point located under said membrane means;

flap means for covering a tube for said IV device;

securing means for securing said flap means to said base means; and

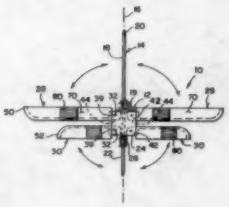
tube clamp means attached to said base means for holding said IV tube such that said IV device will not move when stress is applied to said IV tube.

4,966,591

NEEDLE ASSEMBLY

Frank Yuen, 110-20 71st Ave., Forest Hills, N.Y. 11375

Filed Oct. 20, 1988, Ser. No. 260,197
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—192 **4 Claims**



1. A needle assembly for withdrawing body fluids, comprising:

a body having a first side and a second opposite side and a first end and a second opposite end, and a centrally-disposed aperture extending through said body generally normally with respect to said first and second ends to define a longitudinally-extending central axis, said first side being generally parallel to said second side of said body; a vertical member connecting said first side to said second side in a spaced apart manner, such that the cross-section of said body along said central axis is I-shaped;

a hollow needle extending through said body aperture and having a first needle end portion with a tip extending outwardly along said central body axis from said first end of said body, and a second needle end portion with a tip extending outwardly along said central body axis from

said second end of said body, said needle tips each having a beveled face oriented to face one of said sides of said body;

a first pair of cover elements, each of which has a longitudinally-extending interior channel, and each of which cover elements has an extension means for pivotally coupling said cover elements to said body and said extension means disposed adjacent said first end thereof by being positioned and held within the I-shaped cross-section defined by the space between the first side of said body, the connecting vertical member, and the second side of said body;

and a second pair of cover elements, each of which has a longitudinally extending interior channel, and each of which cover elements has an extension means for pivotally coupling said cover elements to said body and said extension means disposed adjacent said second end thereof by being positioned and held within the I-shaped cross-section defined by the space between the first side of said body, the connecting vertical member, and the second side of said body;

said pairs of cover elements being pivotable between an open position, in which said cover elements of each pair extend wing like in opposition directions generally normally to said central axis, and a closed position in which said cover elements of each pair abut one another with their respective channels cooperating to enclose the respective needle end portion therebetween, whereby when said cover elements are disposed in said wing like open position, they are in tandem back to back relationship and allow the user to determine the orientation of the beveled face of the needle; and

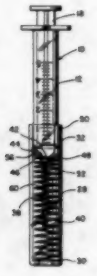
means for locking said first and second pairs of said cover elements in said closed position.

4,966,592

PROTECTIVE SLEEVE FOR HYPODERMIC NEEDLE

Cameron A. Burns, and Terry A. Burns, both of 1620 Woolston Ct., Modesto, Calif. 95355

Filed May 5, 1989, Ser. No. 347,588
Int. Cl.[5] A61M 5/00
U.S. Cl. 604—198 **12 Claims**



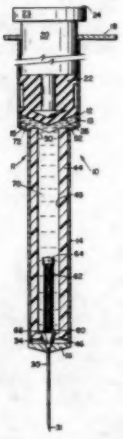
1. An elongated syringe barrel component including needle mounting means at one end and a needle mounted from said needle mounting means and projecting endwise outwardly of said one end, a protective sleeve component having first and second ends, said sleeve component being slidingly telescoped over said one end of said barrel component and rotatable relative thereto with a first end of said sleeve component shiftable between extended and retracted limit positions relative to said one end, said sleeve component, when in said retracted position, projecting a predetermined extend outwardly of said one nd inwardly of the outer extremity of said needle and when in said extended position extending outward of said outer extremity, biasing means operatively connected between said barrel and sleeve components lightly yieldingly biasing said sleeve component toward said extended position, said barrel and sleeve component including coacting pin and slot connection means establishing said limit positions and effecting rotational oscillation between said barrel and sleeve components as said sleeve component completes and initiates its movement toward and away from, respectively, said retracted position, said pin and slot connection means including a longitudinal control slot formed in one of said components and a pin carried by the other component slidingly and guidingly received in said control slot, said control slot including first and second closed end portions defining said extended and retracted limit positions, respectively, said first end portion extending laterally in one direction partially about said one component and said second end portion incorporating a lateral slot segment extending partially about said one component in which said pin may be received from said control slot second end portion and retained against the biasing action of said biasing means, said first end portion, including a slot segment extending a short distance longitudinally of said one component toward said other slot end portion and in which said pin is receivable, said one component also including an entrance slot formed therein including one end opening into said control slot intermediate the closed ends of said control slot end portions and a second end opening endwise outwardly of said one component adjacent the end thereof remote from said lateral slot segment.

4,966,593

DISPOSABLE HYPODERMIC SYRINGE WITH RETRACTABLE NEEDLE

James J. Lennox, Berwick, Pa., assignor to Design Specialties Laboratories, Kingston, Pa.

Filed Mar. 6, 1989, Ser. No. 319,154
Int. Cl.[5] A61M 5/32
U.S. Cl. 604—198 **12 Claims**



1. A syringe for one-time use comprising tubular means including a rearward tubular section having a first open end and a forward tubular section extending forwardly from said rearward section and including a second closed end, needle means slidably mounted through said closed end for movement from a first position in which it extends beyond said closed end and a second position in which it is retracted within said tubular means, locking means for locking said needle means in said first position, bias means for urging said needle means from said first position to said second position, plunger means mounted in said rearward tubular section and forwardly displaceable toward said second end to dispense fluid contained in said tubular means through said needle means into a patient, release means responsive to forward movement of said plunger means to automatically release said locking means and cause

said bias means to move said needle means to said second position, said release means including tubular actuator means separate from said plunger means and movably mounted within said forward tubular section from a rearward position to a forward position in which it releases said locking means, said tubular actuator means having rear abutment means engagable by said plunger means toward the end of its stroke and moved by said plunger means from said rearward position to said forward position as forward displacement of said plunger means is continued for a short distance.

4,966,594

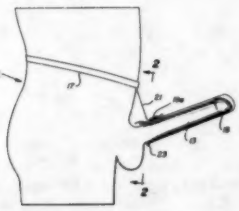
APPARATUS FOR PREVENTING THE SPREADING OF ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

Herman A. Thomas, 2221 Orange Blossom La., Bradenton, Fla. 33507

Continuation-in-part of Ser. No. 72,677, Jul. 18, 1987, abandoned. This application Aug. 31, 1987, Ser. No. 91,455

Int. Cl.[5] A61F *5/44*

U.S. Cl. 604—349 **4 Claims**



1. A device for preventing the spread of acquired Immune Deficiency Syndrome, commonly called AIDS, virus comprising:

a belt surrounding the mid-body and hip portion of a male person, said belt having a front portion and a back portion;

a single tab depending from said front portion of said belt;

a condom;

means for removably securing said condom to said tab;

said condom conventionally having a ring portion;

said tab being of sufficient length so that a free end of said tab is adjacent the ring portion of the condom when worn, said tab having a loop at its free end;

wherein said removable securing means comprises a conventional stocking clip having a hook at one end and an opening at its other end, said opening having an enlarged area portion and a reduced area portion;

said clip hook being removably attachable to said tab by inserting said hook through said tab loop.

4,966,595

SURGICAL SPONGE ASSEMBLY

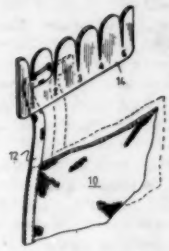
Joseph Meringola; Gerard Lo Duca, both of Farmingdale, N.Y., assignors to Medical Action Industries, Inc., Farmingdale, N.Y.

Filed Sep. 6, 1988, Ser. No. 241,032

Int. Cl.[5] A61F *13/00*

U.S. Cl. 604—393 **4 Claims**

1. A surgical sponge assembly comprising in combination, a plurality of sponges, each having attached thereto along one side thereof a twill strip, and a holder provided with a plurality of slots equal in number to the sponges, the twill strip of each individual sponge being attached in a corresponding slot of



said holder, whereby the number of such sponges, as well as their individuality are readily visible.

4,966,596

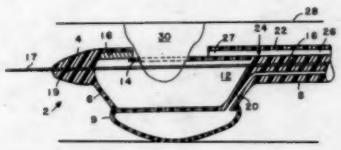
LASER ATHERECTOMY CATHETER

Richard E. Kuntz, and Donald S. Baim, both of Newton, Mass., assignors to The Beth Israel Hospital Association, Boston, Mass.

Filed Aug. 8, 1988, Ser. No. 229,622

Int. Cl.[5] A61B *17/36*

U.S. Cl. 606—7 **12 Claims**



1. A method to remove an eccentric vascular obstruction from a patient comprising the steps of:

inserting a guidewire into an artery to a point beyond an eccentric vascular obstruction;

inserting a catheter over said guidewire into the artery, said catheter having a housing including a radially located cut-out window on one surface, said cut-out window exposing a housing cavity, and a balloon attached to an opposite exterior surface, said housing containing a mobile bundle of fiber optic cables, said bundle being flattened at an end of the bundle proximal to the cut-out window and said bundle connected to a laser energy source at an opposite end;

positioning said cut-out window over said eccentric vascular obstruction;

inflating the balloon such that the eccentric vascular obstruction extends through said cut-out window into said housing; and

delivery laser energy across said cut-off window while advancing said flattened end of the mobile bundle of fiber optic cables across said cut-off window to excise and to retain the eccentric vascular obstruction within said housing.

4,966,597

THERMOMETRIC CARDIAC TISSUE ABLATION ELECTRODE WITH ULTRA-SENSITIVE TEMPERATURE DETECTION

Eric R. Cosman, 872 Concord Ave., Belmont, Mass. 02178

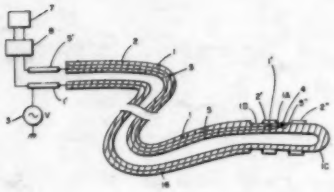
Filed Nov. 4, 1988, Ser. No. 267,211

Int. Cl.[5] A61B *17/32*

U.S. Cl. 606—50 **4 Claims**

1. An electrode catheter system with temperature control

adapted for making radiofrequency heat lesions in a body and particularly the cardiac region and having built-in thermocouple temperature sensor which can sense the temperature of the heated body tissue, said electrode having the shape of a elongated catheter with a distal end that is intended to be directed into the bodily tissue, particularly near the cardiac region to be heated, and a proximal end which is adapted to be connected to an external source of radiofrequency energy and to an external thermocouple temperature monitoring apparatus through a connection means, a portion of the elongated catheter electrode that will be inserted into the body comprising a flexible, tubular structure with an internal lumen and having a longitudinally extending insulating material portion, said electrode having at least one uninsulated conductive tip at its distal end from which, when in use, radiofrequency current will flow to heat surrounding tissue, said electrode having conductive means connecting said uninsulated distal tip to said connection means located near said proximal end of said electrode adapted for connection to an external source of radiofrequency potential, and whereby said internal lumen can be used to insert stylet means to that said catheter can be tunneled deep within the body through blood vessels, whereby when in use, said uninsulated tip will be at said radiofrequency potential, said electrode having a first metal element and a second metal element, both metal elements running from said proximal end



to said distal end of said electrode, said two metal elements being the two sides of a thermocouple pair, said two metal elements being embedded within said longitudinally extending insulating material portion and electrically insulated from each other over the length of said electrode except at said distal end, the distal ends of said two metal elements being electrically fused at said distal end of said electrode to form a thermocouple junction in such a way that a portion of each of said distal ends of said two metal elements and a portion of said fused junction are part of an external surface of said uninsulated tip, the proximal ends of said two metal elements near the proximal end of said electrode are so adapted to be connected to an external thermocouple junction potential measuring apparatus; whereby, when in use, said electrode is inserted into the living body by inserting a stylet into said lumen means within said catheter-shaped electrode, and thus said distal end of said electrode can be worked into the proper position within the blood-carrying structure of the living body, once in position so described, the radiofrequency potential of said uninsulated tip of said electrode will cause a current to flow in and thus heat up the tissue surrounding said uninsulated tip, and said distal portions of said two metal elements and said portion of thermocouple junction which are on the external surface of said uninsulated tip will provide an intimate thermal contact with the heated tissue adjacent to said external surface and thus a reliable measure of the temperature of said adjacent tissue.

4,966,599

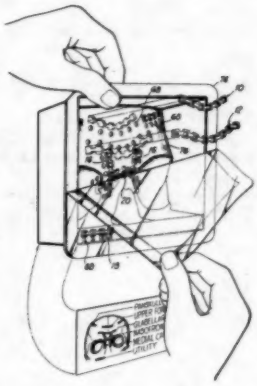
ANATOMICAL PRECONTOURED PLATING, INSTRUMENTS AND METHODS

Richard A. Pollock, 5260 Riverview Rd., NW, Atlanta, Ga. 30327

Continuation of Ser. No. 274,699, Nov. 15, 1988, abandoned, which is a continuation of Ser. No. 35,658, Apr. 7, 1987, abandoned. This application May 3, 1990, Ser. No. 518,221

Int. Cl.[5] A61B *17/58*

U.S. Cl. 606—69 **21 Claims**



1. Apparatus for osteosynthesis comprising:

(a) at least one osteosynthesis plate shaped to conform in three dimensions to a portion of the facial skeleton, which plate has a changing radius of curvature from one point to the next along its longitudinal axis; and

(b) a sealed container enclosing the osteosynthesis plate, which container includes a three dimensional model of said facial skeleton, said plate placed on the area of the facial skeleton model to which the plate is shaped to conform.

4,966,600

SURGICAL SECURANCE METHOD

Robert J. Songer, 2104 Butternut, Northbrook, Ill. 60062, and Matthew N. Songer, 2645 W. Grove St., Marquette, Mich. 49855

Filed Jan. 26, 1989, Ser. No. 301,728

Int. Cl.[5] A61B *17/58*

U.S. Cl. 606—74 **21 Claims**

1. The method of surgically securing body parts with a cable, which comprises:

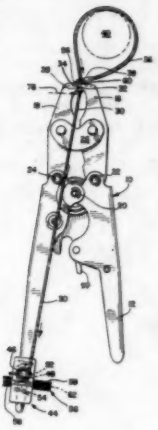
forming a cable loop around the body parts whereby two cable portions are slidingly secured together to define said loop;

placing a tubular crimp member into crimping pliers, said tubular crimp member defining an outwardly extending circumferential flange about its front end as positioned in the crimping pliers;

passing a portion of said cable outside of said loop through the tubular crimp member from front to rear;

connecting said cable to a winding shaft, with a cable portion between the opposed cable end and loop occupying said crimp member;

rotating said winding shaft to tighten said cable about the body parts to a predetermined tightness; and



collapsing said crimp member with said crimping pliers, whereby a permanent cable loop of predetermined tightness is formed.

4,966,601

EVACUATABLE BONE CEMENT SYRINGE

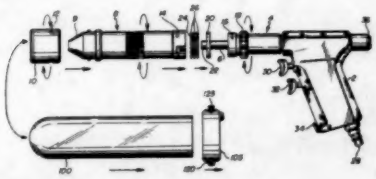
Klaus Draenert, Gabriel-Max-Str. 3, D-8000 Munich 90, Fed. Rep. of Germany

Continuation of Ser. No. 388,745, Aug. 2, 1989, abandoned, which is a continuation of Ser. No. 131,135, Nov. 17, 1987, abandoned. This application Jan. 16, 1990, Ser. No. 464,563

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609672

Int. Cl.[5] A61M *5/245;* A61F *5/04;* B01D *39/00*

U.S. Cl. 606—92 **8 Claims**



1. An apparatus for mixing and applying bone cement, comprising:

(a) a container for receiving the bone cement prior to its application,

(b) a pressure generating apparatus operative within the container for prepressurizing the bone cement wherein the container and for later applying the bone cement,

(c) vent means in gaseous communication with the bone cement for enabling gases in the bone cement to escape out of the bone cement and the container when pressure is exerted by the pressure generating apparatus,

(d) evacuating means in gaseous communication with the container for sucking off the gases which escape under pressure from the container,

(e) means for retaining the bone cement in the container which will permit escape of gases while the cement is pre-pressurized.

4,966,602

COMPRESSION DEVICE FOR THE ANASTOMOSIS OF HOLLOW ORGANS

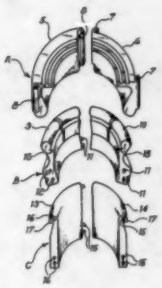
Carlo Rebuffat, Largo Corsia dei Servi, 11, and Riccardo Rosati, Via Livorno, 4, both of Milano, Italy

Filed Sep. 27, 1989, Ser. No. 413,312

Claims priority, application Italy, Sep. 28, 1988, 22096 A/88

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—154 **12 Claims**



1. A compression device for the anastomosis of hollow organs, comprising: a first member having a hollow cylinder shape and suitable to contain a second member having a hollow cylinder shape as well, whereby between said two members the edges of said two hollow organs to be anastomosized can be inserted, and a third member having a hollow cylinder shape that is suitable to press the second member against the first one, thereby compressing the edges of said hollow organs, characterized in that each of said three members consists of sectors that are solidly connected to one another until said edges are present between the first and second members and separate into fragments when said edges necrotize.

4,966,603

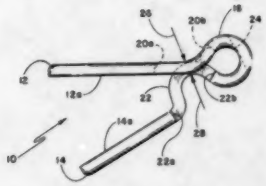
ANEURYSM CLIP

Dennis M. Focelle, Minneapolis, and Terrance W. Hanlon, Blaine, both of Minn., assignors to RMS Company, Minneapolis, Minn.

Filed Jul. 24, 1989, Ser. No. 384,124

Int. Cl.[5] A61B *17/12*

U.S. Cl. 606—158 **4 Claims**



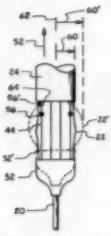
1. A one-piece aneurysm clip comprising first and second cooperable jaw portions, a resilient coil portion, a first connecting portion extending between said first jaw portion and said coil portion having a longitudinal slot therein, and a generally U-shaped second connecting portion extending between said second jaw portion and said coil portion, said second connecting portion being curved and having a thickness correlated with the width of said slot so as to be movable therein.

4,966,604

EXPANDABLE ATHERECTOMY CUTTER WITH FLEXIBLY BOWED BLADES

Robert E. Reiss, La Jolla, Calif., assignor to InterVentional Technologies Inc., San Diego, Calif.

Filed Jan. 23, 1989, Ser. No. 299,148
Int. Cl.[5] A61B *17/32*
U.S. Cl. 606—159 2 Claims



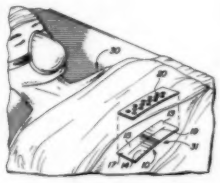
1. An expandable atherectomy cutting device comprising:
a guide wire;
a desmodromic wire;
a torque tube rotatably positioned about said guide wire, said torque tube having a sidewall including a channel for slidably receiving said desmodromic wire;
a tip rotatably positioned on said guide wire, said tip being slidable along said guide wire between a first position and a second position;
four flexible blades spaced 90° apart, each said blade having one end connected to said torque tube and another end connected to said tip, each said flexible blade urging said tip to said first position wherein each said blade defines a first radius of cutting action; and
means associated with said tip and said casing for urging said tip to said second position wherein each said blade defines a second radius of cutting action greater than said first radius of cutting action, said means for urging said tip to said second position comprising a base controllably movable along said torque tube, said base being connected to said tip by said desmodromic wire for drawing said tip into said second position.

4,966,605

METHOD FOR OPENING AND CLOSING SURGICAL WOUNDS

William R. Thieler, 2175 Via Tuscany, Winter Park, Fla. 32789

Filed Jul. 28, 1988, Ser. No. 225,377
Int. Cl.[5] A63B *17/00*
U.S. Cl. 606—214 21 Claims



1. A method for opening and closing a surgical wound at a treatment site, comprising the steps of:
adhering an elastic member across the skin at the treatment site;
providing the elastic member with a dimension longer than the surgical wound so as to leave the elastic member uncut on opposite ends of the surgical wound;
opening the surgical wound by cutting through the elastic member and through the patient's skin at the treatment site;
conducting a surgical procedure in the wound;
reapproximating the patient's skin at the treatment site by bringing the cut edges of the elastic member together; and thereafter
adhering a flat, relatively inelastic sealing member over the elastic member for maintaining the cut edges of the elastic member together while the surgical wound heals.

4,966,606

DETERGENT COMPOSITION

Peter F. Garner-Gray, Lancashire; Peter C. Knight, Cheshire, and Ian Niven, Liverpool, all of United Kingdom, assignors to Lever Brothers Company, division of Conopco, Inc., New York, N.Y.

Filed Oct. 28, 1987, Ser. No. 114,187

Claims priority, application United Kingdom, Nov. 7, 1986, 8626691

Int. Cl.[5] C11D *3/37, 10/02*

U.S. Cl. 252—174.14 4 Claims

1. A particulate detergent composition having improved disproved dispensibility comprising

i. from 5% to 40% by weight of a detergent active system containing one or more detergent actives selected from selected from the group consisting of anionic non-soap detergent actives, nonionic detergent actives and soap;

ii. from 10% to 40% by weight of a water-soluble alkali metal carbonate selected from selected from the group consisting of sodium carbonate, potassium carbonate and mixtures thereof;

iii. from 5% to 60% by weight of a seed crystal for calcium carbonate selected from the selected from group consisting of calcite and mixtures thereof with aragonite or vaterite, the seed crystal having a surface area of at least 10 m^2/g,

said composition being in the form of particles having a mean size of at least 500 microns, less than 2% by weight of said particles having a size of less than 50 microns, with the proviso that said particles have a Rosin-Rammler distribution n value of at least 4 if the mean particle size of the particles of the entire composition is not more than 700 microns.

4,966,607

METHOD OF PRODUCING DYED POLYSACCHARIDE:AMINO OR IMINO STARCH DERIVATIVE WITH REACTIVE DYE

Hiroshi Shinoki, Saitama, and Mitsunori Ono, Minami-ashigara, both of Japan, assignors to Fuji Photo Film Co. Ltd., Kanagawa, Japan

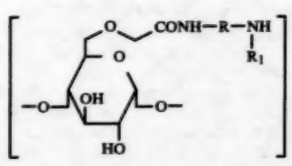
Filed Apr. 14, 1989, Ser. No. 339,014

Claims priority, application Japan, Apr. 18, 1988, 63-93459

Int. Cl.[5] C09B *62/00, 62/04;* C08B *31/00;* D06P *3/00*

U.S. Cl. 8—549 12 Claims

1. A method of producing a dyed polysaccharide which comprises linking a reactive dye, capable of linking to an amino group or imino group and having a sulfonyl chloride group, carbonyl group, triazinyl group or vinyl sulfone derivative group to a starch derivative having a glucose derivative unit shown in a general formula as a partial structure of the starch derivative



[I]

wherein R represents an arylene group or an alkylene group and R_1 represents a hydrogen atom or an alkyl group.

4,966,608

PROCESS FOR REMOVING PYRITIC SULFUR FROM BITUMINOUS COALS

Wanda Pawlak; Jerzy S. Janiak; Ali A. Turak, and Boleslaw L. Ignasiak, all of Edmonton, Canada, assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Aug. 9, 1988, Ser. No. 230,139

Int. Cl.[5] C10L *9/00*

U.S. Cl. 44—624 8 Claims

1. A process for reducing sulfur and ash content of bituminous coal comprising the steps of:

(a) grinding the bituminous feed coal to particle size of less than or equal to 600 micrometers to form a fine coal;

(b) mixing said fine coal with water and less than 10% by weight of dry coal of a bridging oil to form a coal-water-oil slurry, said bridging oil consisting essentially of from 100–10% of heavy oil or bitumen and 0–90% of a light oil selected from the group consisting of diesel oil, kerosene and naphtha;

(c) agitating said slurry to form coal microagglomerates;

(d) separating said micro-agglomerates from said slurry to obtain recovered coal;

(e) washing said recovered coal with fresh water through at least one wash cycle, said cycle comprising sequentially agitation, aeration, separation of recovered coal from pyrite-containing water, to form a clean recovered coal characterized by substantially reduced sulfur and ash content as compared to said feed coal.

4,966,609

CONFORMABLE ABRASIVE ARTICLE

Kevin M. Callinan, Michigan City, and James P. Enniss, Granger, both of Ind., assignors to Uniroyal Plastics Co., Inc., Mishawaka, Ind.

Filed Apr. 7, 1989, Ser. No. 335,004

Int. Cl.[5] B24D *11/00*

U.S. Cl. 51—295 24 Claims

1. A flexible abrasive article for cleaning, polishing or smoothing of surfaces comprising a flexible, liquid resistant closed cell thermoplastic polyvinylchloride polyolefin or polyurethane foam substrate which is resistant to absorption or liquids and is capable of conforming to the shape of the irregular surface of an object, said substrate having abrasive particulate matter adhered to at least one surface thereof.

4,966,610

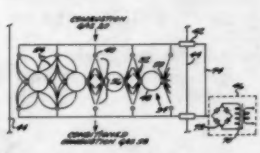
CONDITIONING OF GAS STREAMS CONTAINING PARTICULATE

Henry V. Krigmont, Seal Beach, and Everett L. Coe, Jr., Downey, both of Calif., assignors to Wahlco, Inc., Santa Ana, Calif.

Filed Jun. 5, 1989, Ser. No. 361,272

Int. Cl.[5] B03C *3/00*

U.S. Cl. 55—5 9 Claims



1. A method for precipitating particulate matter from a flowing gas stream, comprising the steps of: furnishing a flowing gas stream containing particulate matter entrained therein; pretreating the particulate matter of the gas stream, by supplying to the gas stream a conditioning agent selected from the

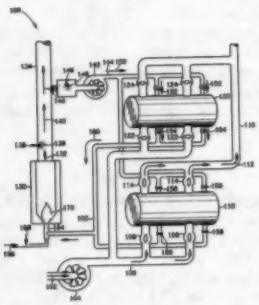
group consisting of sulfur trioxide, a gaseous compound containing ammonia, and water vapor, and substantially simultaneously, establishing an electrostatic potential between the conditioning agent and the particulate matter whereupon the conditioning agent deposits upon the particulate matter; and electrostatically precipitating the particulate matter from the conditioned gas stream.

4,966,611

REMOVAL AND DESTRUCTION OF VOLATILE ORGANIC COMPOUNDS FROM GAS STREAMS

John C. Schumacher, Carlsbad; Joseph C. McMenamin, Oceanside; Lawrence B. Anderson, Encinitas, all of Calif.; Harold R. Cowles, Chandler, Ariz., and Stephen M. Lord, Encinitas, Calif., assignors to Custom Engineered Materials Inc., Oceanside, Calif.

Filed Mar. 22, 1989, Ser. No. 326,908
Int. Cl.[5] B01D 53/04
U.S. Cl. 55—20 19 Claims



1. An emission control process for removing and concentrating volatile organic compounds from a gas stream, in an apparatus including a combustion unit, a set of water injectors and a flue, comprising the steps of:

contacting said gas stream with an adsorbent material to remove said volatile organic compounds therefrom; and thereafter

burning an outside fuel in said combustion unit and discharging a combustion gas into said flue;

humidifying and cooling said flue gas with a stream of injected water introduced into said flue gas by said water injectors so as to provide a humidified flue gas;

condensing said humidified flue gas on said adsorbent material so as to release latent heat, thereby rapidly heating said adsorbent material until said adsorbent material reaches its dew point; and

continuing to heat said adsorbent material above its dew point to dry said adsorbent material, thereby releasing a stream of desorbed volatile organic compounds.

13. An adsorption/regeneration apparatus for removing and concentrating volatile organic compounds from a gas stream, comprising:

an adsorber having adsorbent material;

means for directing said gas stream through said adsorber to generate a clean air stream;

a combustion unit;

a flue to emit a flue gas from said combustion unit wherein said flue includes a conduit in gaseous communication with said adsorber for directing at least a portion of said flue gas to said adsorber;

one or more water injectors disposed in said flue for injecting a stream of water into at least a portion of said flue gas so as to cool said flue gas and provide a humidified flue gas;

means for directing said humidified flue gas through said adsorber wherein said humidified flue gas is condensed on said adsorbent material so as to release latent heat, thereby rapidly heating said adsorbent material until said adsorbent material reaches its dew point and thereafter raising the temperature of said humidified flue gas so as to heat said adsorbent material above its dew point and dry said adsorbent material and generate a desorbed gas stream;

means for burning an outside combustible gas stream, said desorbed gas stream, and mixtures thereof in said combustion unit; and

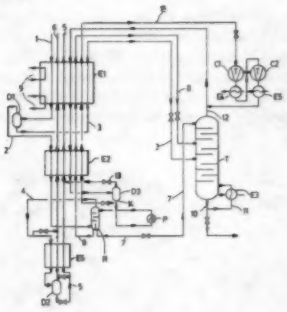
means for mixing said outside gas and said desorbed gas for burning in said combustion unit.

4,966,612

PROCESS FOR THE SEPARATION OF HYDROCARBONS

Heinz Bauer, München, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 343,657
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814294
Int. Cl.[5] F25J 3/02
U.S. Cl. 62—24 23 Claims



1. In a process for the separation of hydrocarbons from a gaseous feedstream containing light and heavy hydrocarbons, wherein said gaseous feedstream, under superatmospheric pressure, is cooled, partially condensed, and separated into a liquid fraction and a gaseous fraction; said liquid fraction is fractionated by a rectification step into a product stream containing essentially higher-boiling components and a residual gas containing predominantly lower-boiling components; said gaseous fraction is introduced into a scrubbing column wherein higher-boiling hydrocarbons are scrubbed out of said gaseous fraction by residual gas obtained during said rectification step, after the partial condensation of said residual gas; and a bottom liquid fraction, obtained in the bottom of the scrubbing column, is fed to said rectification step; the improvement which comprises:

separating said residual gas obtained during said rectification step, after its partial condensation and prior to being fed into a scrubbing zone of said scrubbing column, into a residual gaseous fraction and a residual liquid fraction;

expanding at least a portion of said residual liquid fraction for production of refrigeration;

heating said at least a portion of said residual liquid fraction by heat exchange with partially condensing residual gas obtained during said rectification step; and

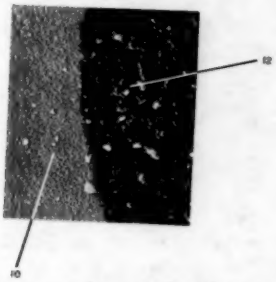
readmixing said at least a portion of said residual liquid fraction with said residual gas obtained during said rectification step, and at least a portion of the remainder of said residual liquid fraction is fed into said scrubbing column.

4,966,613

METHOD OF PRODUCING EFFECTIVE POROUS GLASS SHAPES

Richard P. Beaver, Library, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 30, 1984, Ser. No. 677,106
Int. Cl.[5] C03B *37/075, 19/10;* C03C *15/00*
U.S. Cl. 65—2 18 Claims



1. Method of producing a plurality of distinct, silica-rich, glass shapes with effective pores having greater than around 75 weight percent silica and being essentially free of remnants of carbonaceous material, comprising:

a. forming distinct glass shapes from a heat treatable, leachable glass composition having one or more phase separable materials that lower the melting point of the glass,

b. treating the distinct glass shapes so formed with a fluid chemical treatment having one or more carbonaceous materials to deposit the carbonaceous materials on a substantial portion of the surfaces of the distinct glass shapes,

c. heat treating the plurality of chemically treated glass shapes at a temperature in the range of about 400° C. to about 600° C. to phase-separate at least some of the phase separable materials,

d. leaching the phase-separated glass shapes to remove a substantial amount of the phase-separated, leachable materials to form porous, silica-rich glass shapes,

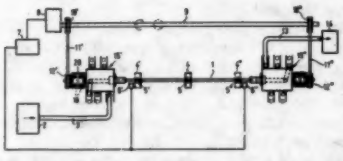
e. removing remnants of the carbonaceous material in an on the porous, silica-rich, glass shapes so that the shapes are essentially free of carbon.

4,966,614

METHOD OF AND DEVICE FOR MANUFACTURING OPTICAL FIBERS

Andreas N. Van Geelen; Jan G. J. Peelen, and Hendrik Venhuizen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 918,590, Oct. 9, 1986, abandoned, which is a continuation of Ser. No. 726,175, Apr. 23, 1985, abandoned, which is a continuation of Ser. No. 527,049, Aug. 29, 1983, abandoned. This application Feb. 16, 1988, Ser. No. 158,081
Claims priority, application Netherlands, Jun. 15, 1983, 8302127
Int. Cl.[5] C03B *37/025;* C03C *17/02*
U.S. Cl. 65—3.12 4 Claims



1. A method of manufacturing an optical fiber from a glass tube having an inside wall, said method comprising the steps of:

supplying a reactive gas mixture from a nonrotating reservoir;

providing a fluid connection from the reservoir to the glass tube;

providing guide means at least at the end of the glass tube receiving the gas mixture;

passing the reactive gas mixture through the inside of the glass tube at a pressure between 0.13 and 13.33 kPa;

heating the glass tube to a temperature between 1100° and 1300° C.;

forming a non-isothermal plasma in the gas mixture in a deposition zone in the tube in order to react the gases in the mixture and form glass on the inside wall of the tube;

moving the plasma in a direction along the glass tube between a first end of a deposition zone and a second end of the deposition zone;

reversing the direction of movement of the plasma each time the plasma reaches an end of the deposition zone; and

then, after forming a number of layers of glass on the inside wall of the tube;

collapsing the inner coated tube to form a solid rod; and

drawing the solid rod into an optical fiber; wherein:

the glass tube is rotated through an angle equal to 360°/n each time the plasma reaches an end of the deposition zone, where n is an integer greater than or equal to 2, the direction of rotation being reversed each time the glass tube is rotated through at least 360° C., said glass tube not rotating when the plasma is moving between the ends of the deposition zone; and

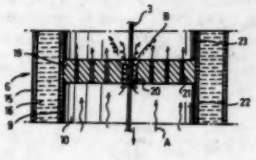
the fluid connection is reeled or unreeled on said guide means as the direction of rotation of the glass tube is reversed.

4,966,615

APPARATUS FOR COOLING AN OPTICAL FIBER

Antti Linden, Atlanta, Ga.; Risto Pennanen, Helsinki, and Lena Stormbom, Vantaa, both of Finland, assignors to Oy Nokia AB, Helsinki, Finland

PCT No. PCT/FI88/00130, § 371 Date Apr. 14, 1989, § 102(e) Date Apr. 14, 1989, PCT Pub. No. WO89/02420, PCT Pub. Date Mar. 23, 1989
PCT Filed Aug. 15, 1988, Ser. No. 346,973
Claims priority, application Finland, Sep. 8, 1987, 873873
Int. Cl.[5] C03B *37/01*
U.S. Cl. 65—12 8 Claims



1. An apparatus for cooling an optical fibre drawn from a heated glass blank prior to applying to the fibre a primary coating, the apparatus comprising:

a cooling pipe defining a tubular cooling space having a longitudinal axis and having an inlet at one end and an outlet at the opposite end of the cooling pipe for passing the fibre axially through the cooling space; and

at least one wall extending transverse to the longitudinal axis of the cooling tube and positioned across the cooling tube so as to partition the space between the inlet and the outlet, the at least one wall having a central opening for passing both the fibre and the cooling gas therethrough simultaneously and having multiple through holes whose axes of symmetry are approximately parallel to the longitudinal axis of the cooling pipe and whose axes are not coincident, the central opening having an area relative the

cross-sectional area of the cooling space effective to cause the cooling gas in the cooling space to flow turbulently through the central opening of the at least one wall around the fibre.

4,966,616

MINERAL WOOL CENTRIFUGE

Lasse Johansson, and Erik Astrand, both of Pargas, Finland, assignors to Oy Partek AB, Pargas, Finland

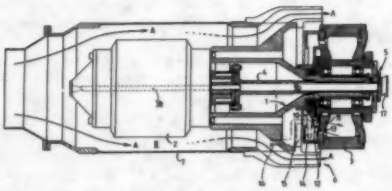
PCT No. PCT/FI88/00019, § 371 Date Aug. 2, 1989, § 102(e) Date Aug. 2, 1989, PCT Pub. No. WO88/06146, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 382,694

Claims priority, application Finland, Feb. 20, 1987, 870712

Int. Cl.[5] C03B *37/035*

U.S. Cl. 65—14 **5 Claims**



1. A mineral wool centrifuge comprising

a rotatable centrifuge wheel (3) for the defibration of a molten mineral material to be passed on to said centrifuge wheel;

a driving motor (2) for the rotation of the centrifuge wheel;

at least one blower air nozzle (6) for applying blowing air to the periphery of the centrifuge wheel for separating mineral fibres from the molten mineral material; and

means (9a, 9b, 17) for applying a binder to the mineral fibres separated from the periphery of the centrifuge wheel, wherein

the centrifuge comprises an unrotatable body shaft (1);

the driving motor (2) is fastened directly to the end face of the body shaft (1), whereby the body shaft and the driving motor form a coaxial, fixed, unrotatable whole; and

a drive shaft (4) of the driving motor (2) for the rotation of the centrifuge wheel is arranged to extend through the body shaft (1) so that the end portion of the drive shaft protruding from one end of the body shaft is connected to the centrifuge wheel (3) mounted in bearings on the body shaft.

4,966,617

PROCESS OF MANUFACTURING VITREOUS BEADS

Hubert Neusy, Montignies-sur-Sambre, Belgium, assignor to Glaverbel, Brussels, Belgium

Division of Ser. No. 216,646, Jul. 8, 1988, Pat. No. 4,894,081. This application Aug. 25, 1989, Ser. No. 398,475

Claims priority, application United Kingdom, Jul. 9, 1987, 8716188

Int. Cl.[5] C03B *19/10*

U.S. Cl. 65—21.3 **14 Claims**

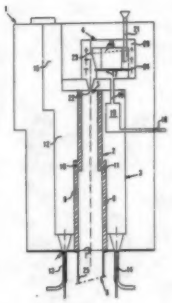
1. A process of manufacturing vitreous beads, comprising:

delivering particulate feedstock to a heated chamber and passing it therethrough so that the feedstock is heated and converted to vitreous beads; and

collecting the beads,

wherein the heated chamber is shaped to provide a flow path for the particulate feedstock which comprises an elongate cross-section and which is arranged so that the particulate feedstock passes downwardly through the heated chamber under gravity from an upper end thereof to a lower end thereof, and

wherein the particulate feedstock passing through the heated chamber is heated by radiant heating means which



provides heat which emanates from the walls of the heated chamber.

4,966,618

METHOD AND APPARATUS FOR BENDING AND TEMPERING GLASS PLATES

Bernard Letemps, Thourotte; Jacques Leclercq, Roisel, and Philippe Dereims, Compiegne, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

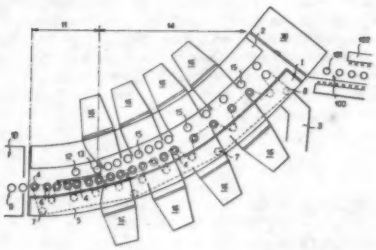
Filed Jun. 5, 1989, Ser. No. 361,355

Claims priority, application France, Jun. 7, 1988, 88 07533

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.[5] C03B *23/033*

U.S. Cl. 65—106 **11 Claims**



1. A bending installation comprising:

a shaping bed having means for supporting and shaping a heated glass plate moving in a conveying direction along said shaping bed, said shaping bed being curved in said conveying direction;

an evacuation conveyor positioned downstream of said shaping bed in the conveying direction, and having a conveying direction non-coplanar with the conveying direction of said shaping bed at a downstream end of said shaping bed; and

swinging means for swinging a glass plate exiting the downstream end of said shaping bed from said conveying direction to the downstream of said shaping bed to said conveyor direction of said evacuation conveyor, comprising:

a rotatable glass plate support element having an axis aligned with, and immediately downstream of, said means for supporting and shaping,

a plurality of holding means mutually spaced about the axis of said support element, each of said holding means having an axis of rotation extending parallel to the axis of said support element, said holding means being rotat-

able together as a drum about the axis of said support element and independent of rotation of said support element, said holding means each being spaced from said support element such that a glass plate exiting the downstream end of said shaping bed is held between said glass plate support element and one of said holding means when said drum is rotated to a receiving position wherein the space between said support element and said one of said holding means is aligned with the glass plate exiting said downstream end of said shaping bed, whereby the weight of a glass plate rotates the drum in a rotating direction to a drive position in which the glass plate is swung to the conveying direction of said evacuation conveyor; and

means for periodically driving said drum in said rotating direction from said drive position to a new receiving position wherein the space between said support element and another one of said holding means is aligned with a glass plate exiting said downstream end of said shaping bed.

4,966,619

DEAD PLATE ASSEMBLY

Shelby M. Withrow, Paradise, Tex., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed May 31, 1989, Ser. No. 359,695

Int. Cl.[5] C03B 27/00

U.S. Cl. 65—348 **20 Claims**

9. A dead plate assembly which comprises

(a) a contact material insert having a multiplicity of apertures;

(b) a dead plate subplate comprising a substantially rigid plate having a multiplicity of apertures therein, and one or more lugs defining a planar depression on one face of said plate, the other face of said plate having an area of increased height corresponding to the area said depression; and

(c) means for attaching said contact material insert to said subplate so that said multiplicity of apertures in said insert and said multiplicity of apertures in said plate are so positioned that they together form a multiplicity of continuous apertures.

4,966,620

METHODS FOR FACILITATING THE HARVEST OF FOOD CROPS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 918,546, Oct. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 455,268, Jan. 3, 1983, Pat. No. 4,818,269, and a continuation-in-part of Ser. No. 445,317, Jan. 3, 1983, Pat. No. 4,460,733, and a continuation-in-part of Ser. No. 442,269, Nov. 17, 1982, abandoned, and a continuation-in-part of Ser. No. 444,667, Nov. 26, 1982, abandoned, and a continuation-in-part of Ser. No. 453,282, Dec. 27, 1982, Pat. No. 4,522,644, and a continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, now Defensive Publication No. 4,910,179. This application Feb. 2, 1989, Ser. No. 305,847

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[5] A01N 59/00, 31/00

U.S. Cl. 71—83 **15 Claims**

1. A method for facilitating the harvest of food crops which comprises applying to the foliage of said crops an amount of an aqueous solution comprising the monourea adduct of sulfuric acid sufficient to desiccate said foliage.

4,966,621

FINELY DISPERSED LIQUID PLANT PROTECTION AGENTS

Rudolf Heinrich, and Konrad Albrecht, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

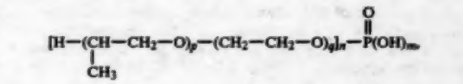
Continuation of Ser. No. 883,859, Jul. 10, 1986, which is a continuation of Ser. No. 578,282, Feb. 8, 1984, abandoned. This application Jun. 3, 1987, Ser. No. 57,482

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1983, 3304677; Dec. 23, 1983, 3346637

Int. Cl.[5] A01N 57/12

U.S. Cl. 71—86 **7 Claims**

1. An aqueous emulsion comprising 10 to 70 percent by weight of water, 5 to 60 percent by weight of a dispersed herbicide and, as a dispersant therefor, 0.5 to 20 percent by weight of at least one member selected from the group consisting of

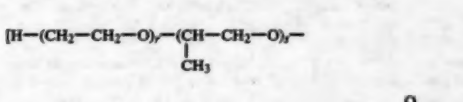


wherein

p is a number between 20 and 30 and

q is a number between 10 and 300;

block copolymer of the formula



wherein

r and s are independently a number between 20 and 300 and

t is a number between 10 and 300,

where n and m in each of said formulas is 1 or 2 and the sum of n and m is 3; and

alkali metal, alkaline earth metal, ammonium, mono-, di-, and tri-alkyl ammonium, and mono-, di-, and tri-alkanolammonium salts of said block copolymers.

4,966,622

N-PHENYL-N-PYRIMIDIN-2-YLUREAS

Hermann Rempfler, Ettingen; Dieter Dürr, Bottmingen, and Rudolf C. Thummel, Courgenay, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

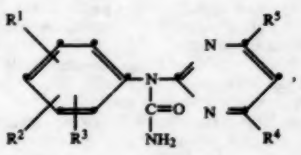
Filed Apr. 3, 1989, Ser. No. 332,193

Claims priority, application Switzerland, Apr. 12, 1988, 1336/88; Apr. 12, 1988, 01336/88

Int. Cl.[5] A01N 43/54; C07D 239/42

U.S. Cl. 71—92 **13 Claims**

1. A compound of formula I



(I)

in which

R^1, R^2 and R^3 are each, independently of the others, hydrogen; halogen; C_1–C_4alkyl, C_1–C_4alkoxy; C_1–C_4haloalkyl; C_1–C_4haloalkoxy; C_1–C_4alkyl-$S(O)_n$-; nitro; cyano; C_1–C_4alkoxycarbonyl; di-(C_1–C_4alkylamino)-carbonyl; mono-(C_1–C_4alkylamino)carbonyl; carbamoyl; C_1–C_4haloalkyl-$S(O)_n$-; C_1–C_4alkylcarbonyl; or -$PO(O$-(C_1–C_4)-alkyl)$_2$;

R^4 is C_1–C_6alkyl; C_1–C_4alkoxy; C_1–C_4alkyl-$S(O)_n$-; C_1–C_4haloalkyl; C_1–C_4haloalkoxy; phenyl that is unsubstituted or is substituted by up to three identical or different substituents from halogen, C_1–C_4alkyl, C_1–C_4haloalkyl and C_1–C_4alkoxy; 2-furanyl; 2-thienyl; 3-thienyl; C_3–C_6cycloalkyl that is unsubstituted or is substituted by up to three identical or different C_1–C_4alkyl radicals; cyano; C_2–C_4haloalkenyl; C_1–C_4alkoxy-C_1–C_4alkyl; C_1–C_4alkoxy-C_1–C_4alkoxy; or halo-C_1–C_4alkylthio;

R^5 is hydrogen; C_1–C_3alkyl; C_1–C_3haloalkyl; halogen; or C_1–C_3haloalkoxy; and

n is 0, 1 or 2,

with the proviso that when R^4 and R^5 are both methyl, at least one of R^1, R^2 and R^3 is other than hydrogen and when one of the radicals R^1, R^2 and R^3 is nitro, that substituent may not be bonded in the 2- or 6-position of the phenyl ring, or a salt or addition compound of formula I with an acid, base or complex former.

9. A method of controlling undesired plant growth which comprises allowing a herbicidally effective amount of a compound according to claim 1 to act on the plant to be controlled or the locus thereof.

4,966,623

USE OF GAMETOCIDAL PYRAZOLES TO PRODUCE HYBRID SEED

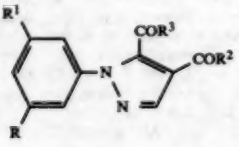
Stephen A. Ackmann, 3296 W. 33rd St., Indianapolis, Ind. 46222; James R. Beck, 10023 Penrith Dr., Indianapolis, Ind. 46229, and Fred L. Wright, 124 Lakeview Ct. North, Greenfield, Ind. 46140

Division of Ser. No. 271,127, Nov. 14, 1988, which is a division of Ser. No. 145,735, Jan. 15, 1988, Pat. No. 4,801,326, which is a continuation of Ser. No. 13,520, Feb. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 947,139, Dec. 29, 1986, abandoned, which is a continuation of Ser. No. 841,405, Mar. 19, 1986, abandoned. This application Sep. 11, 1989, Ser. No. 405,786

Int. Cl.[5] A01N *33/56*

U.S. Cl. 71—92 **3 Claims**

1. A method of producing hybrid cereal grain seed having a male and a female parent variety, comprising planting seed of said male and female parent varieties in separate plots adjacent to each other, supplying to the female parent plants growing from said female parent seed, at a time prior to anther formation, a pollen formation inhibiting amount of a compound of the formula



(I)

wherein

R and R^1 independently represent chloro, bromo, or methyl;

R^2 is hydroxy, C_1–C_4 alkoxy, C_3–C_4 alkenoxy, C_3–C_4 alkoynoxy, or a phytologically-acceptable moiety forming a salt of the carboxylic acid;

R^3 is NH_2, hydroxy, or a phytologically-acceptable moiety forming a salt of the carboxylic acid;

or R^2 and R^3 combine to form an imide;

provided that R^3 is NH_2 when R^2 is alkoxy, alkenoxy, or alkynoxy; and that R^2 and R^3 are the same when R^3 is other than NH_2; said female parent variety being sensitive to said treatment, allowing said treated female parent plants to be pollinated by the male parent plants growing from said male parent seed and to produce hybrid seed, and harvesting said hybrid seed from the treated female parent plants.

4,966,624

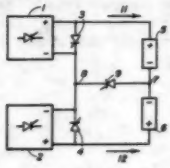
METHOD AND APPARATUS FOR ELECTRIC REFINING OF LEAD

Ivan D. Enchev; Lyuben R. Starev; Elieser P. Illel, and Georgi N. Korudanov, all of Plovdiv, Bulgaria, assignors to Institute Po Tzvetna Metalurgia, Plovdiv, Bulgaria

Filed Sep 6, 1989, Ser. No. 403,700

Int. Cl.[5] C22B *4/00*

U.S. Cl. 75—10.65 **2 Claims**



1. A method for electric refining of lead with alternating current having a period duration 7 to 30 sec, relative duration of reverse pulses being 2 to 8% of the duration of combined forward and reverse pulses and density of forward current pulses being 100 to 500 A/m^2, said method comprising the steps of

dividing the process into three consecutive stages, a preparatory stage, an initial stage and a basic stage;

during the preparatory stage, subjecting the surfaces of elecrodes to the action of current pulses of differing polarity with equal width and intensity for a period of 600 to 900 seconds with pulses having a width of 5 to 15 seconds;

during the initial stage, effecting an electric refining with alternating current with reduced current density for a period of 2 to 30 hours, the density of the forward current during the initial stage being half that necessary for the basic stage of the process, the density of the reverse current during the initial being 50% to 80% of that of the normal current during the initial stage;

during the basic stage, effecting an electric refining with alternating current with a density of the reverse current during the basic stage being 50% to 80% of that of the normal forward current during the basic stage.

4,966,625

FERRITE COMPOSITE CONTAINING SILVER METALLIZATION

Richard J. Charles, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 172,834, Mar. 25, 1988, Pat. No. 4,880,599. This application Jun. 5, 1989, Ser. No. 361,183

Int. Cl.[5] C22C *29/12*

U.S. Cl. 75—234 **10 Claims**

1. A composite comprised of a polycrystalline ferrite matrix containing a continuous electrically conductive metallization of elemental silver, said silver metallization having two end portions and having only said end portions exposed at least sufficiently for electrical contact to be made therewith, said ferrite matrix having an electrical resistivity greater than 500 ohm-centimeters at a temperature ranging from about 20° C. to about 100° C., said ferrite matrix ranging up to about 40% by volume in porosity.

4,966,626

SINTERED FERRO ALLOY HAVING HEAT AND WEAR RESISTANCE AND PROCESS FOR MAKING

Akira Fujiki; Yoshiteru Yasuda, both of Kanagawa; Hiroyuki Endo, Chiba; Yutaka Ikenoue, Chiba, and Keitaro Suzuki, Chiba, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Hitachi Powdered Metals Company, Limited, Matsudo, both of, Japan

Filed Jun. 28, 1989, Ser. No. 373,053
Claims priority, application Japan, Jun. 28, 1988, 63-158199
Int. Cl.[5] C22C *29/04*
U.S. Cl. 75—238 17 Claims

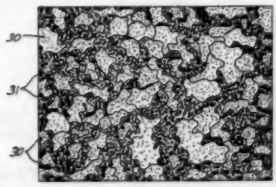
1. A sintered ferro alloy having heat and wear resistance comprising:
5 to 25 wt % of at least one element selected from the group consisting of Mo and W,
2 to 10 wt % of Cr,
0.1 to 0.9 wt % of Si,
less than or equal to 0.7 wt % of Mn,
less than or equal to 0.05 wt % of P,
0.5 to 0.2 wt % of C,
0.5 to 0.2 wt % of B,
0.1 to 7.0 wt % of at least one boride of rare earth elements, and
residual Fe and contaminants.

4,966,627

COMPOSITE CEMENTED CARBIDE

Madapusi K. Keshavan, Irvine, and Proserfina C. Rey, Laguna Beach, both of Calif., assignors to Smith International, Inc., Houston, Tex.

Filed Aug. 4, 1988, Ser. No. 228,099
Int. Cl.[5] C22C *29/08*
U.S. Cl. 75—240 6 Claims



1. A sintered body of cemented metal carbide comprising:
a plurality of regions of a first type of cemented metal carbide; and
a plurality of regions of a second type of cemented metal carbide, wherein the first type of cemented metal carbide having a larger average particle size than the second type of cemented metal carbide and the second plurality of regions being interspersed with the first plurality of regions, the regions collectively forming the body of cemented metal carbide with the two types of regions being approximately uniformly distributed throughout the body.

4,966,628

SECURITY DOCUMENT PRINTING INK

Albert Amon, Lausanne; Anton Bleikolm, Ecublens; Pierre Degott, Pully; Olivier Rozumek, Chailly, and Haim Bretler, Lausanne, all of Switzerland, assignors to Sicpa Holding SA, Switzerland

Continuation-in-part of Ser. No. 186,598, Apr. 27, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 313,092
Int. Cl.[5] C09D *11/08*
U.S. Cl. 106—30 17 Claims

1. A printing ink in paste form for the printing of documents by the method of engraved steel die printing, said ink comprising print forming ink solids which contain oleoresinous components, and at least one volatile organic solvent to be evaporated during or after printing, wherein said ink solids contain a film forming macromolecular hydrophilic surface active composition having a number average molecular weight of at least 1,000 in partial replacement of said oleoresinous components, the weight ratio between said surface active composition and said oleoresinous components being in the range of (10–60):(-10–80), and wherein the amount of said volatile organic solvents is less than about 15% by weight of the total weight of the printing ink, the ink containing up to about 40% by weight of water.

4,966,629

HOT FORMING MOLD AND METHOD OF MANUFACTURING THE SAME

Koichi Tsukiyama, Yokohama; Hideaki Takahashi, Sendai; Koichi Tsutsumi, Ichikawa; Takashi Watanabe, Chiba; Chiharu Wada, Tokyo; Keitaro Kunugiza, Yokohama, and Satoshi Teramura, Chiba, all of Japan, assignors to Onada Cement Co., Ltd, Yamaguchi and Onada Alc Co., Ltd., Aichi, both of, Japan

Continuation-in-part of Ser. No. 125,046, Nov. 25, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 256,015
Claims priority, application Japan, Sep. 25, 1987, 62-238778
Int. Cl.[5] B28B *7/34*; C04B *35/22*
U.S. Cl. 106—38.27 3 Claims

1. A hot forming mold made of xonotlite which is in a form suitable for hot forming under hot gas pressure, said mold having a bulk density of 0.5 to 2.20 g/cm^3, a bending strength of at least 100 kg/cm^2, and a Vickers hardness of at least 4.

4,966,630

ANTICORROSIVE PIGMENT COMPOSITION AND AN ANTICORROSIVE COATING COMPOSITION CONTAINING THE SAME

Masaaki Okuda, Takarazuka, Japan, assignor to Tayca Corporation, Osaka, Japan

Filed Mar. 27, 1989, Ser. No. 328,993
Int. Cl.[5] B32B *19/00*; C04B *14/30*; C09C *1/04, 1/40*
U.S. Cl. 106—426 10 Claims

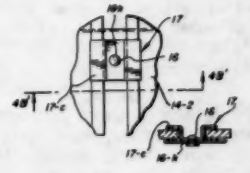
1. IN an anticorrosive pigment composition comprising a mixture of (A) aluminum dihydrogen tripolyphosphate and (B) zinc oxide, the improvement wherein (A) and (B) are present in the composition at a weight ratio from about 10:1 to about 10:20 and at least one thereof is surface treated with about 1 to about 5% by weight of aluminum stearate.

4,966,631

SUPPORT FOR PHOTOVOLTAIC ARRAYS

Ronald W. Matlin, Lexington, Mass.; Richard K. Lenskold, Flemington, N.J., and Anand Rangarajan, Lexington, Mass., assignors to Chronar Corp., Princeton, N.J.

Filed Mar. 13, 1989, Ser. No. 322,628
Int. Cl.[5] H01L *31/042*
U.S. Cl. 136—244 20 Claims



1. A supported photovoltaic array comprising
a first row of support elements set in the earth;
a second row, spaced from said first row, of support elements set in the earth;

a plurality of first members, each spanning a plurality of said support elements;

a plurality of second members spanning said first members; and

a set of photovoltaic modules mounted on each pair of said second members, with each module separated from an adjacent module, with each adjacent pair of modules being secured to an underlying second member by at least one cushioned, load-spreading attachment positioned in the spaces between adjacent pairs of modules.

4,966,632

PROCESS FOR THE ANNEALING TREATMENT OF METAL STRIPS

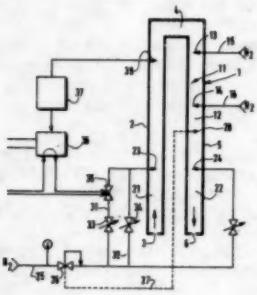
Olivier Ecalle, Versailles, and Valéry Vinckx, Bignaos, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Mar. 14, 1989, Ser. No. 323,564

Claims priority, application France, Mar. 16, 1988, 88 03372; Mar. 16, 1988, 88 03273

Int. Cl.[5] C21D *1/76*

U.S. Cl. 148—16 **11 Claims**



1. Process for an annealing treatment of metal articles, in a furnace comprising in interconnected relation: an entrance end zone for the metal articles to be treated, a heating zone, a cooling zone following the heating zone in the direction of travel of the articles through the furnace, and an exit end zone for the treated metal articles, said process comprising injecting a gas having a high hydrogen content in said heating zone and a dense inert gas in the vicinity of said end zones, said process further comprising regulating the injection of the dense inert gas in an end zone under the control of a maintenance of the hydrogen content at a set value in a zone located in the vicinity of said hot zone adjacent to said end zone in which the inert gas injection is under the control of the hydrogen content in a way which increases the injection of dense inert gas if the hydrogen content tends to increase and vice versa, the inert gas flow in said end zone being in any case maintained at a minimum value.

4,966,633

COERCIVITY IN HOT WORKED IRON-NEODYMIUM BORON TYPE PERMANENT MAGNETS

Earl G. Brewer, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 26, 1989, Ser. No. 371,186

Int. Cl.[5] H01F *1/04*

U.S. Cl. 148—101 **7 Claims**

1. A method of increasing coercivity in a hot worked, rapidly solidified material consisting essentially of a predominant phase of hot work deformed fine grains of $RE_2TM_{14}B$ and at least one coercivity contributing intergranular phase, said deformed fine grains contributing magnetic anisotropy to the hot worked material, said method comprising quenching the material to below 100° C. from an elevated temperature at which the equilibrium quantity of such intergranular phase is substantially greater than its equilibrium quantity below 100° C.

4,966,634

COMPOSITION OF THE SURFACE TREATMENT FOR METAL AND THE TREATMENT METHOD

Kenshi Saeki, Hiratsuka; Iwao Kawasaki, Narashino; Yoshikazu Shikaze, Yokohama, and Mamoru Sugaya, Kawasaki, all of Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

PCT No. PCT/JP87/00507, § 371 Date May 12, 1988, § 102(e) Date May 12, 1988, PCT Pub. No. WO88/00622, PCT Pub. Date Jan. 28, 1988

Continuation of Ser. No. 181,291, May 12, 1988, abandoned. This PCT application Jul. 14, 1987, Ser. No. 381,991

Claims priority, application Japan, Jul. 14, 1986, 61-163559; Dec. 29, 1986, 61-315848

Int. Cl.[5] C23C *22/26*

U.S. Cl. 148—251 **13 Claims**

1. A composition for treating metallic surfaces, said composition having a pH of 5 or less and comprising

(a) hexavalent chromium ions or hexavalent and trivalent chromium ions, and

(b) an emulsion of an acrylate polymer obtained by emulsion-polymerization of a mixture of monomers in the presence of an emulsifying agent consisting essentially of a nonionic emulsifying agent essentially free of anionic and cationic emulsifying agents comprising a polyoxyethylene-polyoxypropylene block copolymer, said mixture of monomers comprising:

(1) an ethylenically unsaturated carboxylic acid,

(2) at least one of N-methylol acrylamide, N-methylol methacrylamide, N-butoxy methylacrylamide, N-butoxy methyl-methacrylamide, a phospho-oxyalkyl(-meth)acrylate, or an alkoxyalkyl(meth)acrylate, and

(3) a(meth)acrylate monomer.

4,966,635

METHOD OF MAKING A COMPOUND CABLE

Kenichi Sato, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 559,682, Dec. 9, 1983, abandoned, which is a division of Ser. No. 263,919, May 15, 1981, Pat. No. 4,463,219. This application Jul. 27, 1988, Ser. No. 225,661

Claims priority, application Japan, May 16, 1980, 55-65615; Jun. 11, 1980, 55-79416

Int. Cl.[5] H01B *5/08*

U.S. Cl. 148—275 **8 Claims**

1. A process for making a low audible noise compound cable comprising wires selected from the group consisting of aluminum wire, aluminum alloy wire, aluminum-clad steel wire and aluminum alloy-clad steel wire stranded at least on the outer periphery of said cable, wherein the surface of each wire on the outer periphery of said cable is covered by a hydrated film as a result of having been treated in water or aqueous vapor having a temperature of 90° C. or greater, thereby enabling the surface of the cable to have a hydrophilic property, which process comprises providing a compound cable comprising said wires having wire drawing lubricant thereon and stranded at least on the outer periphery of said cable, treating said cable with organic solvent to remove said lubricant from the outer periphery of said cable, subjecting the surface of said cable to

a blast treatment or liquid honing treatment to roughen the outer periphery of said cable, and treating said roughened cable in water or aqueous vapor having a temperature of 90° C. or greater to form said hydrated film.

4,966,636

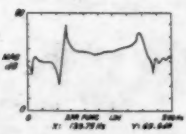
TWO-PHASE HIGH DAMPING CAPACITY F3-MN-AL-C BASED ALLOY

Chi-Meen Wan, Hacienda Heights, Calif., assignor to Famcy Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 218,695, Jul. 8, 1989, Pat. No. 4,875,933. This application Apr. 20, 1989, Ser. No. 341,117

Int. Cl.[5] C22C *38/04, 38/06*

U.S. Cl. 148—329 **14 Claims**



1. A ferrite-austenite two-phase alloy (of high damping capacity) having a composition consisting essentially of 10 to 45 wt % manganese, 4 to 15 wt % aluminum, up to 12 wt % chromium, 0.01 to 0.7 wt % carbon and the balance essentially iron, with the ferrite phase of said alloy having about 25% to 75% by volume, the remainder being essentially austenite, said alloy having a damping capacity of about the same level as that of ductile iron.

4,966,637

METHOD FOR MANUFACTURING AN ELECTROMAGNETIC SHIELDING GASKET

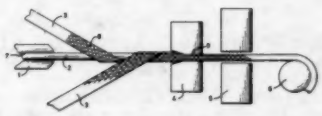
Claude F. Laborie, Perrosson, France, assignor to Rollin, S.A., Steinbach, France

Filed Jan. 10, 1989, Ser. No. 295,702

Claims priority, application France, Jan. 13, 1988, 88 00320

Int. Cl.[5] B29C *47/06*; B32B *1/08, 31/26*

U.S. Cl. 156—47 **12 Claims**



1. A method for manufacturing an electromagnetic shielding gasket comprising forming a core of an elastomeric material, coating the core with at least one electrically conductive band of a conductive textile material so as to surround the core with the material and calibrating the coated core by passing it through at least one die which also causes the band of textile material to be in contact with the elastomeric material of the core.

4,966,638

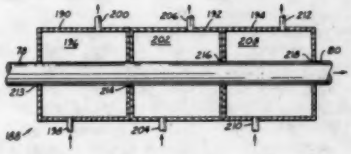
SILICONE MIXTURE AND METHOD OF USING IT

Donald Mudgett, Coopersville, Mich., assignor to Lestox, Inc., Birmingham, Mich.

Filed Jun. 13, 1989, Ser. No. 365,748

Int. Cl.[5] H01B *13/06*

U.S. Cl. 156—51 **10 Claims**



8. A mixture comprising:

a vulcanizing silicone rubber;

a clay material that has been dried, sifted and pulverized;

alumina-trihydrate; and

said mixture contains of 80% by volume of said vulcanizing silicone rubber, 15% by volume of said dried and sifted clay material, and 5% by volume of alumina-trihydrate.

9. A method as recited in claim 8, and wherein said mixture is utilized as an electrical insulator.

4,966,639

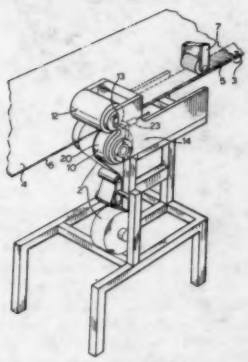
APPARATUS FOR MANUFACTURE OF REINFORCED FILE FOLDERS

George Pfeffer, Minnetonka, Minn., and Donald T. Barber, Toronto, Canada, assignors to Wright Line of Canada Ltd., Willowdale, Canada

Filed Feb. 18, 1987, Ser. No. 16,082

Int. Cl.[5] B31F *5/00, 5/08*

U.S. Cl. 156—359 **4 Claims**



1. In an apparatus for making side tab file folders from paper stock as the paper stock is withdrawn from a paper web stock supply and advanced along a predetermined path, said apparatus including means for folding over an edge of the web and secure the same as the web stock is advanced to produce an edge having a double thickness, the improvement comprising a station to apply a plastic reinforcing film to an edge region of the paper web stock upstream of the means for folding and securing, said station including a roll supply of plastic laminate film having a first layer high tensile strength and a second layer which serves as a thermally activated adhesive, a heated drum over which said film is at least partially trained with said first layer in direct contact with the surface of said heated drum

which raises the temperature of said film to thermally activate said second layer while maintaining said first layer below its thermally active adhesion temperature, said heated drum being positioned to apply said heated film to said paper stock with said second layer being brought into direct contact with said paper web stock in alignment with an edge thereof and being pressed against the paper web stock by a pressure roller cooperating with said heated drum and located to the opposite side of said paper stock, and wherein said heated drum includes control means which senses the exterior temperature of said drum and causes an electrical resistance heating element means with said drum to be activated at a lower threshold temperature and deactivated at an upper limit temperature and wherein said heating element means is of a power greatly exceeding the energy necessary to raise the temperature of the film in isolation of the paper substrate; and wherein said drum is hollow and includes means for urging said electrical heating element means into pressure contact with the interior of said drum about the cylindrical surface thereof, said drum includes insulation means interior to said electrical heating elements means to provide an interior lining of said cylindrical surface and element means while defining a longitudinally extending hollow passage bound by said insulation.

4,966,640

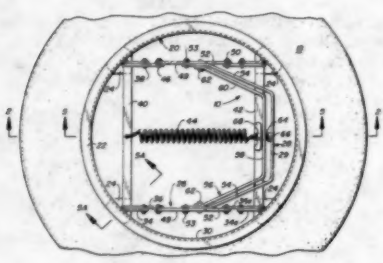
ADJUSTABLE TIRE RECAPPING APPARATUS

Gilbert L. Hill, Troy, N.C., assignor to Oliver Rubber Company, Oakland, Calif.

Filed Jun. 30, 1989, Ser. No. 374,957

Int. Cl.[5] B29D *30/56*

U.S. Cl. 156—394.1 **7 Claims**



1. A retreading curing ring apparatus for mounting on a tire retreading assembly that includes a tire carcass defining a retread area and integral sidewalls having inner circular beads adjacent their free ends, a thin layer of uncured rubber positioned on said tread area, a preformed tread strip covering said uncured rubber layer and a flexible envelope surrounding such tread strip and said sidewalls and extending downwardly toward said circular beads, said curing ring apparatus being positioned adjacent one of said sidewalls for securing and sealing said envelope to said tire, said curing ring apparatus comprising:

a circular body member for engaging a portion of the envelope and the circular tire bead;

guide means adjacent said circular body member for concentrically aligning said tire carcass relative to said circular body member;

a plurality of moveable backup means spaced inwardly from said circular body member and at predetermined spaced apart circumferential locations relative to said circular body member and adapted to engage the inside of said tire sidewall in its bead area;

a single handle means;

linkage means interconnecting said backup means and said circular body member and controllable by said single handle means for moving said circular body member and said plurality of backup means together, thereby pressing and sealing said envelope against the bead portion of the tire; and

adjustment means connected to said handle means and said linkage means for varying the distance between said circular body member and said plurality of backup means when said curing ring device is in its closed position, thereby enabling said device to accommodate tires with different bead thicknesses.

4,966,641

COLOR INTENSIVE IRON OXIDE BLACK PIGMENTS OBTAINED BY THE NITROBENZENE REDUCTION PROCESS AND A PROCESS FOR ITS PREPARATION

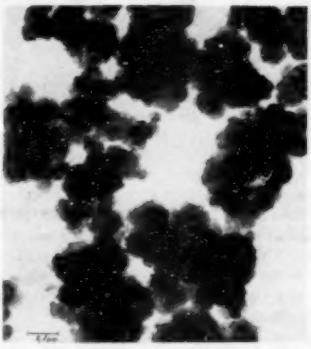
Axel Westerhaus; Karl-Werner Ganter, and Gunter Buxbaum, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Continuation of Ser. No. 59,492, Jun. 8, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 281,912

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1986, 3620333

Int. Cl.[5] C09C *1/24*

U.S. Cl. 106—456 **5 Claims**



1. In the process for preparation of improved iron oxide black pigments by the reaction of aromatic nitro compounds with metallic iron of form finely divided pigment which is predominantly Fe_3O_4, the improvement comprising heating the finely divided uncoated Fe_3O_4 pigment to a temperature of 400° C. to 750° C. under a non oxidizing atmosphere.

4,966,642

METHOD OF THE CONTINUOUS PRODUCTION OF CIRCUIT BOARD STRUCTURES

Klaus Zitzmann, Krefeld, Fed. Rep. of Germany, assignor to G. Siempelkamp GmbH & Co., Krefeld, Fed. Rep. of Germany

Filed Apr. 5, 1989, Ser. No. 333,989

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1988, 3811467

Int. Cl.[5] B32B *31/08*

U.S. Cl. 156—164 **12 Claims**

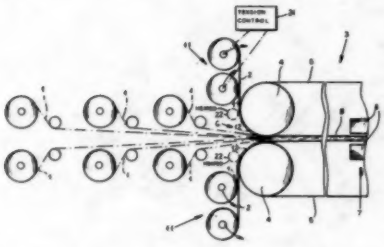
1. A method of making a circuit board structure, comprising the steps of:

(a) uniting a strip of a metal foil and a glass-fiber strip containing a thermally hardenable synthetic resin at a contact interface therebetween to form a two-layer composite strip;

(b) continuously feeding said composite strip and additional continuous glass-fiber strips containing thermally hardenable synthetic resin together into a mouth of a continuous press between a pair of juxtaposed drums around which pressing belts are guided to form said mouth and between said pressing belts so as to form continuously a stack of said strips with said metal foil forming an outer surface of said stack, whereby said two-layer composite strip meets

layers formed by said additional strips in said press, said uniting of step (a) comprises said metal foil and said glass-fiber strip being held under tension and applied to an arcuate portion formed by one of said belts as it rotates around a respective one of said drums and against which surface the layers of said two-layer composite strip are united;

(c) passing said stack between said pressing belts through said press while heating said stack so as to merge said



glass-fiber strips, compact said stack and harden said resin and form a continuous board, said metal foil and said glass-fiber strip united therewith shielding said additional glass-fiber strips from heat radiation emanating from at least one of said belts and from a respective one of said drums whereby said additional glass-fiber strips pass into said mouth without being subjected to detrimental thermal radiation; and

(d) cooling said board.

4,966,643

METHOD FOR ATTACHING A LABEL TO A SURFACE OF A PACKAGE

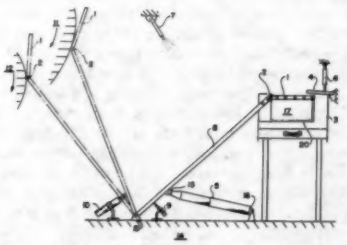
Pekka Turkki, Helsinki, Finland, assignor to Valmet Paper Machinery, Inc., Helsinki, Finland

Division of Ser. No. 126,265, Nov. 25, 1987. This application Feb. 28, 1989, Ser. No. 316,949

Claims priority, application Finland, Nov. 28, 1986, 864853

Int. Cl.[5] B65C *3/12, 9/18, 9/22*

U.S. Cl. 156—215 **4 Claims**



1. A method for attaching at least one of a plurality of printed labels to a surface of a package comprising the steps of:

(a) introducing at least one of said plurality of printed labels onto an upper surface of a suction plate with a printed side of said at least one label facing the suction plate wherein a portion of said at least one label extends at least partially over a pressure roller located between said suction plate and a swing arm;

(b) applying a vacuum to said suction plate for securing at least one label thereto;

(c) ripping said at least one label from an adjoining one of said plurality of printed labels by a predetermined initial tear amount;

(d) rotating said swing arm toward the surface of said package, thereby completely severing said at least one label from the adjoining one of said plurality of printed labels said swing arm being connected to said suction plate;

(e) wetting an adhesively-precoated reverse side of said at least one printed label positioned on said suction plate as said swing arm is being rotated toward the surface of said package;

(f) slowing movement of said swing arm as the swing arm approaches the surface of said package; and

(g) introducing said at least one printed label as said swing arm completes its rotation and said at least one label contacts the surface of said package into a nip formed between said pressure roller and the surface of said package so that said package brings about attachment of said at least one label to the surface of said package as said package rotates and causes said at least one label to pass through the nip.

4,966,644

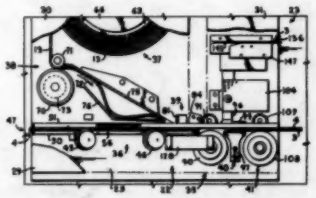
CHECK STRIP ATTACHMENT AND REMOVAL APPARATUS

Jack G. Clark, Jr., and Joseph W. Schouster, both of Houston, Tex., assignors to Zip Strip, Inc., Houston, Tex.

Filed May 16, 1989, Ser. No. 352,555

Int. Cl.[5] B65C *5/02*

U.S. Cl. 156—247 **11 Claims**



1. An apparatus for attaching a strip of an encodable material having an encodable portion and a heat activatable adhesive portion to a longitudinal edge of a generally rectangular document, said apparatus, comprising:

(a) a frame;

(b) a material supply assembly including a continuous length of the encodable material wrapped around a reel, said reel being rotatably secured to a hub attached to said frame;

(c) alignment means comprising a document path and an encodable material path intersecting at a pair of radially abutting alignment rollers, said alignment rollers aligning a document leading edge with an encodable material leading edge, said encodable material path being positioned in relation to said document path so that the heat activatable adhesive portion of the encodable material is aligned to be placed in abutting and overlapping relation along the longitudinal edge of the document so that the encodable portion extends below the longitudinal edge of the document;

(d) document feed means for feeding the document along said document path to said alignment rollers, said document feed means comprising a grooved track defining a V-shaped groove, a guide plate, and at least one document advance roller, track and said guide plate defining said document path, said document advance roller radially abuting said guide plate and having an axis of rotation which forms an acute angle with said document path for advancing said document into said apparatus and along said document path and urging said document onto said track both in a downward and sidewise motion;

(e) encodable material feed means for feeding said encodable material along said encodable material path to said alignment rollers comprising a pair of radially abuting encodable strip feed rollers, a first guide surface and a second guide surface, said encodable strip feed rollers advancing said encodable material along said encodable material path defined by said first and second guide surfaces so that said document path has a sinusoidal shape providing slack to said alignment rollers;

(f) a cutting assembly for cutting said encodable material aligned with said document to form a strip having a preselected length relative to the length of the document, said cutting assembly comprising a passive blade and an active blade, said active and passive blades extending along opposite sides of said encodable material path and said active blade being selectively engageable to cross said encodable strip path to engage said passive blade and sever the encodable material;

(g) a document sealing path extending beyond said alignment rollers along which the strip and the document are transported in an aligned relationship;

(h) a heater assembly for activating the heat activatable adhesive comprising a heater block and a biasing means; said heater block positioned adjacent to said document sealing path and said biasing means operably urging the document and the strip against each other and against said heater block; and

(i) a pair of radially abutting sealing rollers aligned on opposite sides of said document sealing path after said heater assembly for securing the strip to the document.

4,966,645

CRYSTAL GROWTH METHOD AND APPARATUS

Muhammed A. Shahid, Ewing Township, Mercer County, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 4, 1989, Ser. No. 445,522

Int. Cl.[5] C30B *11/14*

U.S. Cl. 156—616.4 **8 Claims**

1. A method for making wafers of a semiconductor material comprising the steps of:

selecting a particular crystallographic orientation for the resulting wafers;

growing an ingot of the semiconductor material in a first crystallographic direction;

constraining growth of a major portion of the ingot such that, in a section taken perpendicularly to the first direction, the outer surface of the ingot substantially defines an ellipse having major and minor axes, the major axis being longer than the minor axis;

and repeatedly cutting the ingot in the direction of the minor axis and at a sufficient angle with respect to the first direction to yield wafers each having a substantially circular outer periphery and having the selected crystallographic orientation.

4,966,646

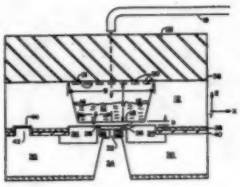
METHOD OF MAKING AN INTEGRATED, MICROMINIATURE ELECTRIC-TO-FLUIDIC VALVE

Mark Zdeblick, Mountain View, Calif., assignor to Board of Trustees of Leland Stanford University, Stanford, Calif.

Division of Ser. No. 911,242, Sep. 24, 1986, Pat. No. 4,824,073. This application Oct. 26, 1988, Ser. No. 263,117

Int. Cl.[5] H01L *21/306*; B44C *1/22*; C23F *1/02*; C03C *15/00*

U.S. Cl. 156—633 **17 Claims**



1. A method for manufacturing an apparatus comprising the steps of:

(1) etching a membrane cavity trench using masking material in a first semiconductor wafer having first and second sides with a depth such that a flexible diaphragm is left which is defined by the bottom of the trench and said second side;

(2) etching a nozzle trench in a first side of a second semiconductor wafer having first and second sides using masking material;

(3) making with masking material a sealing surface portion of the second side of said second wafer and etching said second surface back so that when said masking material is removed, said sealing surface projects as a mesa from said second side, said sealing surface being shaped and located so as to have an etched back depression therein located within the perimeter of said nozzle trench as said perimeter is projected onto said second side of said second wafer;

(4) masking a manifold trench portion of said second side of said second wafer without removing said sealing surface masking material and etching said second side of said second wafer back sufficiently to form a manifold trench in said second side around said sealing surface, said etch also being deep enough to etch said second side of said second wafer so as to form a fluid communication path from said depression to said nozzle trench so as to create a nozzle aperture in said sealing surface;

(5) removing all masking material and oxide from said second side of said second wafer;

(6) bonding said second side of said second wafer to said second side of said first wafer so that said sealing surface and nozzle aperture are located such if said flexible diaphragm is flexed toward said second wafer far enough, said flexible diaphragm would come to rest on said sealing surface and cut off flow of any material flowing through said nozzle aperture;

(7) filling said membrane cavity trench with a material which has a changing vapor pressure with changing temperature and hermetically sealing said material in said membrane cavity.

4,966,647

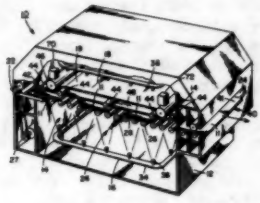
METHOD FOR SINGLE SIDE SPRAY PROCESSING OF PRINTED CIRCUIT BOARDS

Arthur J. Siegmund, Hamden, Conn., and Henry E. Ladouceur, West Hampton, Mass., assignors to Siegmund, Inc., Hamden, Conn.

Division of Ser. No. 403,574, Sep. 6, 1989. This application Feb. 20, 1990, Ser. No. 482,310

Int. Cl.[5] B44C *1/22*; C23F *1/00*; C03C *15/00, 25/06*

U.S. Cl. 156—640 **3 Claims**



1. A method of treating a single side of an at least partially conductive substrate comprising the steps of:

positioning a substrate in a treatment chamber, the chamber having a horizontal conveyor table for transporting and supporting the substrate thereon, means for spraying reactive spray upwardly towards the conveyor table, and a protective covering belt located above the conveyor table, the substrate being substantially sandwiched between the conveyor table and the covering belt with the covering belt substantially sealing a top side of the substrate and substantially fixedly but movably holding the substrate against the conveyor table; and

spraying reactive spray upwardly through aperture in the conveyor table onto a bottom side of the substrate to react therewith whereby reactive spray is substantially prevented from contacting a top side of the substrate and reactive spray can relatively freely leave the substrate after contact therewith.

4,966,648

PROCESS FOR PRODUCING THIN FILM MAGNETIC HEAD

Tsuneo Nakamura, Nara; Kazuyoshi Imae, Higashiosaka; Haruhiko Deguchi, and Tohru Kira, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan

Filed Jun. 23, 1989, Ser. No. 370,181

Int. Cl.[5] B44C *1/22*; B29C *37/00*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **16 Claims**

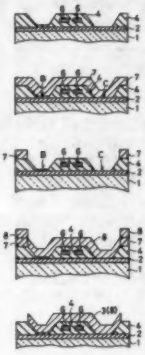
1. A process for producing a thin film magnetic head by forming a nonmagnetic material layer over a lower magnetic core layer with an electrically conductive coil layer embedded in the nonmagnetic material layer, and forming an upper magnetic core layer of a predetermined pattern over the resultant to provide the thin film magnetic head, the upper magnetic core layer of the predetermined pattern being formed by the steps of:

(a) forming a resin film over an area including and wider than the area of the predetermined pattern;

(b) etching the resin film to form a resin film pattern, reverse to that of the predetermined pattern;

(c) forming a layer of magnetic material over the resin film pattern to thereby form a resultant; and

(d) subjecting the resultant to plasma etching using an oxygen-containing gas, to remove both resin film remaining from step (b) and the magnetic material previously formed



on the remaining resin film to thereby leave a magnetic material layer in the predetermined pattern.

4,966,649

PROCESS FOR MANUFACTURING A VIBRATING TYPE TRANSDUCER

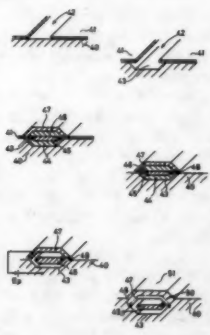
Kinji Harada; Kyoichi Ikeda; Hideki Kuwayama; Takashi Kobayashi; Tadashi Nishikawa; Tetsuya Watanabe, and Takashi Yoshida, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Division of Ser. No. 245,681, Sep. 16, 1988, Pat. No. 4,926,143. This application Oct. 20, 1989, Ser. No. 424,510

Claims priority, application Japan, May 27, 1988, 63-129671

Int. Cl.[5] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—647 **16 Claims**



1. In a manufacturing process for vibrating type transducer, wherein a beam which functions as a vibrator is formed integrally across a recess formed on a thin diaphragm formed on a silicon substrate through a predetermined first gap with said diaphragm, a top thereof being covered with a shell through a predetermined second gap with said vibrator, the improvement comprising the steps of

integrally forming a gap corresponding part consisting of silicon or silicon oxide, which is formed finally into said first gap and second gap, and said beam forming said vibrator with said substrate,

covering an upper portion of said gap corresponding part with a part equivalent to said shell integrally with said substrate,

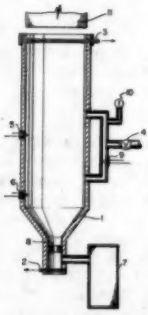
forming an injection port for etching reagent which reaches said gap corresponding part on said shell equivalent part, removing said gap corresponding part through etching, and closing said injection port for air tightness.

4,966,650

METHOD FOR FRACTIONATION OF LIGNINS FROM STEAM EXPLODED LIGNOCELLULOSICS TO PROVIDE FRACTIONS WITH DIFFERENT PROPERTIES

Edward A. DeLong, 439-22560 Wye Road, Sherwood Park, Alberta, Canada (T8A 4T6), and George S. Ritchie, 2428 Westview Village, Winterburn, Alb., Canada (T0E 2N0)

Filed Sep. 19, 1988, Ser. No. 246,069
Claims priority, application Canada, Sep. 17, 1987, 547109
Int. Cl.[5] D21B *1/36*; D21C *3/18, 3/20, 3/26*
U.S. Cl. 162—14 15 Claims



1. A method for preparing a lignin solution by extraction of steam-exploded, dissociated lignocellulosic material and providing thermosetting and thermoplastic lignins from the lignin solution, which comprises:

(a) extracting the steam-exploded dissociated lignocellulosic material with water at a temperature no greater than 40° C., to provide a water solution of water solubles and residual lignocellulosic material;

(b) extracting the residual lignocellulosic material from step (a) with an extractant selected from the group consisting of an alcohol and a caustic solution to provide a solution of extracted lignins;

(c) recovering lignins from the solution of extracted lignins;

(d) treating lignins recovered in step (c) with a halocarbon solvent to provide a halocarbon solution of thermoplastic lignins and undissolved thermosetting lignins;

(e) recovering thermoplastic lignins from the halocarbon solution of thermoplastic lignins of step (d);

wherein the undissolved thermosetting lignins have a purity greater than 90 percent as measured by methoxyl content, are substantially free of carbohydrate, vegetable oil, water soluble lignin constituents and thermoplastic lignins, have a number average molecular weight in the range of 1,500–2,000 daltons and a melting point in the range of about 170° C., to 180° C.;

and wherein the thermoplastic lignins recovered in step (e) have a purity greater than 90 percent as measured by methoxyl content, are substantially free of carbohydrate, vegetable oil, water soluble lignin constituents and thermosetting lignins, have a number average molecular weight in the range of 800–1,000 daltons and a melting point in the range of about 125° C. to 135° C.

4,966,651

METHOD OF PAPER MAKING USING AN ABRASIVE REFINER FOR REFINING BLEACHED THERMOCHEMICAL HARDWOOD PULP

Robert A. Olson, York New Salem, and Lewin R. Lutz, III, York, both of Pa., assignors to P.H. Glatfelter Company, Spring Grove, Pa.

Continuation-in-part of Ser. No. 143,843, Jan. 14, 1988, abandoned. This application Jan. 12, 1989, Ser. No. 296,022
Int. Cl.[5] D21C *1/02, 9/00*
U.S. Cl. 162—28 15 Claims

1. A method for improving a paper made from a paper pulp containing pulp thermochemically derived from hardwoods comprising bleaching the thermochemically derived hardwood pulp, refining the bleached hardwood containing pulp in a refiner having a particulate randomly dispersed abrasive on at least one of the surfaces of the refiner disks, said abrasive being dispersed over at least a substantial portion of said surface of said disk which most directly comes in contact with said pulp during refining wherein the whole vessels per gram and the vessel picks per square centimeter of the paper produced by said method are reduced to a lower level for a given Freeness °S-R than when said at least one of the surfaces of the refiner disks does not have the particulate randomly dispersed abrasive over at least a substantial part of said surface of said disk thereon.

4,966,652

INCREASING THE STIFFNESS OF PAPER

Richard B. Wasser, Norwalk, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 18,386, Feb. 25, 1987, abandoned. This application Nov. 3, 1989, Ser. No. 432,285
Int. Cl.[5] D21H *17/38*
U.S. Cl. 162—135 12 Claims

1. A method of stiffening paper which comprises (A) adding to paper at the size press end of a paper-making machine, with or without starch, an effective amount of a composition consisting essentially of an aqueous solution of:

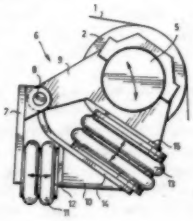
(1) a water-soluble polymer of acrylamide and (2) glyoxal the ratio of (1):(2) ranging from about 90:10 to about 25:75, respectively, (B) drying the resultant paper and (C) recovering the resultant stiffened paper sheet.

4,966,653

APPARATUS FOR CONTROLLING A MOVING BAND

Mauri Rantala, Nokia, and Lasse Syrjä, Tampere, both of Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Sep. 26, 1989, Ser. No. 412,933
Claims priority, application Finland, Oct. 26, 1988, 884943
Int. Cl.[5] D21F *1/40*
U.S. Cl. 162—273 7 Claims



1. An apparatus for controlling the passage of a moving band (**1**; **101**), comprising a control roll (**2**; **102**) having a shaft making contact with the band (**1**; **101**) and extending transversely of the band (**1**; **101**), an adjusting means (**6**; **106**) comprising a turning arm (**9**; **109**) mounted turnably with respect to a ma-

chine body (3) about a turning shaft (8; 108) transverse to the band (1; 101), and at least two bellows type adjusting devices (11, 13; 111, 113, 116, 118) acting between the turning arm (9; 109) and the machine body (3), the position of the turning arm (9; 109) with respect to the machine body (3) being adjustable by means of the bellows type adjusting devices, whereby one end of the control roll (2, 102) is mounted turnably to the machine body (3) while the other end is mounted to the turning arm (9; 109) at a distance from the turning shaft (8; 108), the position of the shaft of the control roll (2; 102) relative to the longitudinal direction of the band (1; 101) being adjustable by varying the position of the turning arm (9; 109), characterized in that the adjusting means (6; 106) comprises an auxiliary arm (10, 110) mounted so as to turn coaxially with the turning arm (9; 109), that at least one of the at least two bellows type adjusting devices (11; 111, 116) is mounted between the body (3) and the auxiliary arm (10; 110) in such a manner that the position of the auxiliary arm (10; 110) with respect to the body (3) is adjustable by means of said at least one of the at least two bellows type adjusting devices (11; 111, 116), that at least another of the at least two bellows type adjusting devices (13; 113, 118) is mounted between the auxiliary arm (10; 110) and the turning arm (9; 109) in such a manner that the position of the turning arm (9; 109) with respect to the auxiliary arm (10; 110) is adjustable by means of said at least another of the at least two bellows type adjusting devices (13; 113, 118), the adjusting means being structured and arranged so that the position of the turning arm (9; 109) with respect to the body (3) and as a consequence the position of the control roll (2; 101) is adjustable with respect to the band (1; 101).

4,966,654

SOIL AND GROUNDWATER REMEDIATION SYSTEM

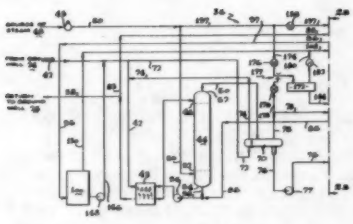
Terrance K. Carberry, Canyon Country, Calif., assignor to AWD Technologies, Inc., South San Francisco, Calif.

Continuation-in-part of Ser. No. 246,057, Sep. 19, 1988. This application Jan. 24, 1989, Ser. No. 301,571

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[5] B10D *3/38*

U.S. Cl. 202—177 **3 Claims**



1. A system for simultaneously removing hydrocarbon contaminates from water and moisture-ladened air comprising:

stripping means for stripping the hydrocarbon contaminates from the contaminated water providing heated clean water and a first mixture of hydrocarbon contaminated steam and vaporized hydrocarbon contaminates;

a first condenser means for receiving the first mixture and condensing a portion thereof providing a second mixture of contaminated water and condensed hydrocarbon contaminates and the remaining portion of the first mixture substantially comprising uncondensed hydrocarbon contaminates;

separator means for receiving the contaminated water and condensed hydrocarbon contaminates from said first condenser means and the uncondensed hydrocarbon contaminates and providing separated condensed contaminated water, condensed hydrocarbon contaminates and uncondensed hydrocarbon contaminates;

a second condenser means for receiving hydrocarbon contaminated moisture-ladened air providing contaminated water and uncondensed hydrocarbon contaminates; and

absorber means for receiving the uncondensed hydrocarbon contaminates from said second condenser means and said separator means for absorbing same.

4,966,655

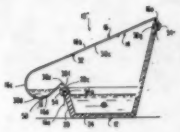
PLASTIC COVERED SOLAR STILL

William M. Wilkerson, Jr., 4214 University Dr., Charlotte, N.C. 28209

Continuation of Ser. No. 355, Jan. 5, 1987, abandoned. This application Aug. 5, 1988, Ser. No. 229,778

Int. Cl.[5] B01D *3/00*

U.S. Cl. 202—234 **4 Claims**



1. A solar still comprising at least one elongated upwardly open thermally insulated pan for holding a liquid to be distilled, said pan having first and second elongated side walls each having a top edge with said first side wall being higher than said second wall, an open wire frame comprised of a plurality of wire frame members each having a J-shaped configuration disposed in spaced apart parallel vertical planes respectively, each wire frame member having first and second ends, an elongated substantially straight portion adjacent said first end and a substantially U-shaped portion adjacent said second end, means for securing said first end of each wire frame member to said first side wall adjacent the top edge thereof with said straight portion inclined downwardly towards said second side wall, means for securing said second end of each wire frame member to said second side wall adjacent the top edge thereof with said U-shaped portion extending adjacent the top edge of said second wall outside of said pan, a thin film flexible solar energy transmissive sheet having side edges overlying said frame and means for securing said side edges of said sheet to said side walls adjacent said top edges thereof and for maintaining said sheet in engagement with said frame to define a first downwardly inclined surface overlying said pan upon which evaporated liquid will condense, a trough portion outside of said pan for collecting condensation flowing down said inclined surface, and at least one longitudinally extending straight wire stringer extending along said wire frame members to prevent sagging of the sheet between said wire frame members.

4,966,656

SEPARATION OF STYRENE FROM ETHYL BENZENE OR O-XYLENE BY AZEOTROPIC OR EXTRACTIVE DISTILLATION WITH ESTERS

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Jun. 4, 1990, Ser. No. 533,120

Int. Cl.[5] B01D *3/36, 3/40;* **C07C** *7/06*

U.S. Cl. 203—060.000 **4 Claims**

1. A method for recovering styrene from mixtures of styrene and ethyl benzene which comprises distilling a mixture of styrene and ethyl benzene in a rectification column in the presence of an azeotrope forming agent, recovering ethyl benzene and the azeotrope forming agent as overhead product and the styrene from the stillpot, wherein said azeotrope form-

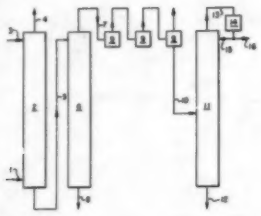
ing agent comprises one material selected from the group consisting of ethyl isovalerate and propyl butyrate.

4,966,657

PROCESS FOR SEPARATING ETHYLENE OXIDE FROM ALDEHYDE IMPURITIES BY DISTILLATION

Francis Delannoy, 61, Rue Ampere, 69310 Pierre-Benite, and Gerard Letray, Rue Docteur Postel, 76620 Le Harve, both of France

Filed Dec. 16, 1988, Ser. No. 285,216
Claims priority, application France, Dec. 22, 1987, 87 18246
Int. Cl.[5] B01D *3/38*; C07D *301/32*
U.S. Cl. 203—76 13 Claims



1. In the process for separating ethylene oxide from aldehyde impurities in contaminated ethylene oxide containing the said aldehyde impurities, as well as water, by distilling the said contaminated ethylene oxide in a reflux column having a top and a bottom, the improvement comprising introducing the contaminated ethylene oxide into a lower level of the reflux column and distilling by refluxing said contaminated ethylene oxide under conditions such that there is a separation of the aldehyde impurities from the contaminated ethylene oxide and the fluid stream leaving the bottom of said reflux column contains the water present in the contaminated ethylene oxide and ethylene oxide in amounts corresponding, on a weight basis, to 0.15 to 3 times the weight of the water in said bottom fluid stream, and the ethylene oxide resulting from the separation of the aldehyde impurities leaves said column at its top.

4,966,658

RECOVERY OF ETHYLENE GLYCOL FROM BUTANEDIOL ISOMERS BY AZEOTROPIC DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Continuation-in-part of Ser. No. 505,663, Apr. 5, 1990, abandoned, which is a division of Ser. No. 457,868, Dec. 27, 1989, Pat. No. 4,935,102. This application Jul. 5, 1990, Ser. No. 548,553
Int. Cl.[5] B01D *3/36*; C07C *31/20*
U.S. Cl. 203—62 2 Claims

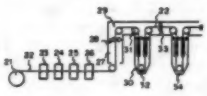
1. A method for recovering ethylene glycol from a mixture of ethylene glycol, 1,2-butanediol and 1,3-butanediol which comprises distilling a mixture of ethylene glycol, 1,2-butanediol and 1,3-butanediol in a rectification column in the presence of an azeotrope forming agent, recovering the ethylene glycol and the azeotrope forming agent as overhead product, obtaining the 1,2-butanediol and the 1,3-butanediol from the stillpot, wherein said azeotrope forming agent is one material selected from the group consisting of cyclohexanone, 3-heptanone, diisobutyl ketone, methyl isoamyl ketone, isobutyl heptyl ketone, 2,6-dimethyl-4-heptanone and 2-methoxyethyl ether.

4,966,659

METHOD FOR MOLTEN SALT ELECTROPLATING OF STEEL

Hirohisa Seto; Atsuyoshi Shibuya; Junichi Uchida; Toshio Nakamori, all of Amagasaki; Hirotaka Nakabayhashi, Osaka; Kenichi Yanagi, Hiroshima; Yukio Kanda, Hiroshima; Junkichi Yoneda, Hiroshima; Katsufumi Hidaka, Hiroshima; Yoshio Shimozato, Hiroshima; Yuuji Furuzawa, Hiroshima; Hajime Shimasaki, Hiroshima, and Toshio Taguchi, Hiroshima, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka and Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, both of, Japan

Division of Ser. No. 202,048, Jun. 3, 1988. This application Aug. 3, 1989, Ser. No. 388,833
Int. Cl.[5] G25D *7/06*
U.S. Cl. 204—28 29 Claims



1. A molten salt electroplating method for a steel member comprising:

a step of drying a steel member which has been cleaned;

a step of preheating said steel member;

a step of activating said preheated steel member by anodic treatment in a molten salt solution; and

a step of electroplating a metal by molten salt electroplating on the activated surface of said steel member

the degree of oxidation of the surface of said steel member being detected during at least one of said drying step and said preheating step, and the anodic treatment conditions in said molten salt solution during said activation step being chosen in accordance with said detected degree of oxidation.

4,966,660

PROCESS FOR ELECTRODEPOSITION OF ALUMINUM ON METAL SHEET

Takahashi Setsuko, Misato; Akimoto Kikuko, Funabashi; Mori Kumiko, Kamagaya, and Akama Ryozo, Tokyo, all of Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

PCT No. PCT/JP88/00658, § 371 Date Oct. 18, 1988, § 102(e) Date Oct. 18, 1988, PCT Pub. No. WO89/00616, PCT Pub. Date Jan. 26, 1989
PCT Filed Jun. 30, 1988, Ser. No. 269,142
Claims priority, application Japan, Jul. 13, 1987, 62-174522; Sep. 29, 1987, 62-244576
Int. Cl.[5] C25D *5/36*, *3/44*
U.S. Cl. 204—34 6 Claims

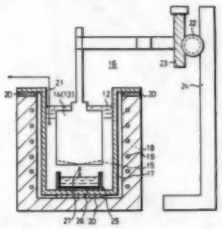
1. A process for the electrodeposition of aluminum on a metal sheet, comprising electroplating aluminum with use of a molten salt bath comprised of from 40 to 80 mol % of an aluminum halide represented by the formula AlX_3, wherein X is Cl, Br or I, and from 20 to 60 mol % of an N-alkylpyridinium halide represented by the formula C_5H_5N—RX, wherein R is an alkyl group having 1 to 5 carbon atoms and X is a halogen atom, wherein, before plating, said metal sheet is activated by carrying out electrolysis on said metal sheet, bringing it to serve as an anode and with use of an activating bath having the same composition as said molten salt bath, and the molten salt bath is purified by leaving metallic aluminum immersed in the bath.

4,966,661

PROCESS FOR PREPARATION OF NEODYMIUM OR NEODYMIUM ALLOY

Hideo Tamamura, Chichibu, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP87/01022, § 371 Date Aug. 23, 1988, § 102(e) Date Aug. 23, 1988
PCT Filed Dec. 23, 1987, Ser. No. 255,201
Claims priority, application Japan, Dec. 23, 1986, 61-307308; Aug. 18, 1987, 62-204879; Sep. 3, 1987, 62-220893
Int. Cl.[5] C25C 3/36, 3/34
U.S. Cl. 204—64 R 49 Claims



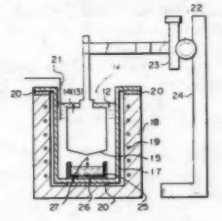
1. A process for the preparation of neodymium or a neodymium alloy, which comprises arranging a plate-shaped carbon electrode as an anode and a plate-shaped metal or carbon electrode as a cathode in a fused salt electrolysis bath so that the electrodes confront each other in the electrolysis bath, covering the electrolysis bath with an atmosphere containing oxygen at a concentration sufficient to oxidize and consume powdery carbon generated from the carbon electrode and floating on the surface of the electrolysis bath during the electrolysis, and performing the electrolysis to deposit neodymium or a neodymium alloy on the cathode and drop the neodymium or neodymium alloy below the cathode to collect the neodymium or neodymium alloy at the bottom of the electrolysis bath.

4,966,662

PROCESS FOR PREPARING PRASEODYNIUM METAL OR PRASEODYMIUM-CONTAINING ALLOY

Hideo Tamamura, Chichibu, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,701
Claims priority, application Japan, Aug. 22, 1988, 63-206459
Int. Cl.[5] C25C 3/34, 3/36
U.S. Cl. 204—71 20 Claims



1. A process for preparing a praseodymium-iron alloy or a praseodymium-neodymium-iron alloy, which comprises electrolyzing (1) using praseodymium fluoride (PrF_3) or (2) a mixture of praseodymium fluoride and neodymium fluoride (NdF_3) as a starting material and carrying out the electrolysis in a fused salt bath having a composition comprising substantially 5 to 34% by weight of PrF_3 or a mixture of PrF_3 and NdF_3 and 95 to 66% by weight of lithium fluoride (LiF) by using an iron cathode.

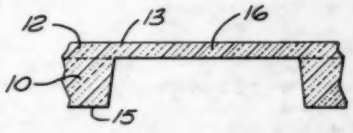
18. A process for preparing praseodymium metal or a praseodymium-neodymium alloy, which comprises electrolyzing (1) praseodymium fluoride (PrF_3) or (2) a mixture of praseodymium fluoride and eodymium fluoride (NdF_3) as a starting material in a fused salt bath having a composition comprising 5 to 75% by weight of PrF_3 or a mixture of PrF_3 and NdF_3 and 95 to 25% by weight of lithium chloride (LiF) using a plate-shaped carbon electrode as an anode and a plate-shaped carbon or infusible material electrode as a cathode arranged in the fused salt bath so that the electrodes confront each other in the bath.

4,966,663

METHOD FOR FORMING A SILICON MEMBRANE WITH CONTROLLED STRESS

Philip E. Mauger, Santa Clara, Calif., assignor to Nanostructures, Inc., Mountain View, Calif.

Filed Sep. 13, 1988, Ser. No. 243,816
Int. Cl.[5] C25F 3/12, 3/14
U.S. Cl. 204—129.3 15 Claims



1. A method for fabricating a silicon membrane with a desired characteristic and level of internal stress comprising the steps of:

(a) selecting a silicon substrate with a first electrical conductivity characteristic, said substrate having first and second opposite sides;

(b) selecting a dopant according to the desired characteristic of internal stress, said dopant having a second electrical conductivity characteristic of opposite polarity to said first electrical conductivity characteristic;

(c) forming a doped layer of predetermined thickness adjacent to said first surface of said substrate wherein the concentration of said dopant is selectively controlled to provide the desired level of internal stress in said doped layer;

(d) electrochemically etching a portion of said second surface of said substrate to a boundary of said doped layer, thereby forming a stress controlled membrane having a thickness approximately equal to the thickness of said doped layer.

4,966,664

METHOD FOR REMOVING PHOTORESIST

Hermann Buerk, Egling A D Paar; Thomas Wagner, Augsburg, and Michael Steinhauser, Eichenau, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

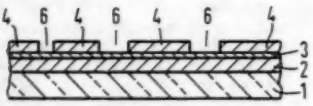
Filed Apr. 10, 1989, Ser. No. 335,858
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1988, 3812315
Int. Cl.[5] C25F 5/00
U.S. Cl. 204—146 11 Claims

1. A method for removing a photoresist that lies over a metallically conductive layer and that was stressed by a fluorine-containing etching plasma comprising the steps of:

(a) connecting a substrate containing the photoresist structure that lies over a metallically conductive layer to a current source;

(b) connecting an inert electrode as a cooperating electrode;

(c) implementing an electrolysis in a basic bath, wherein the substrate and the inert electrode functions as the electrodes; and



(d) terminating the electrolysis and removing and rinsing the substrate with fully desalinated water.

4,966,665

METHOD FOR PHOTOCHEMICAL DECOMPOSITION OF VOLATILE ORGANIC CHLORINE COMPOUND IN VENT GAS

Takashi Ibusuki, Tsukuba; Keigo Nakamura, Toda, and Schuzou Kutsuna, Tsukuba, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,494
Claims priority, application Japan, Oct. 18, 1988, 63-262176
Int. Cl.[5] B01J *19/08*
U.S. Cl. 204—157.3 3 Claims

1. A method for photochemical decomposition of a volatile chlorine-containing organic compound contained in a vent gas which comprises:

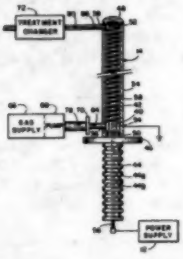
bringing the vent gas containing the volatile chlorine-containing organic compound into contact with titanium dioxide and irradiating the vent gas at the interface with the titanium dioxide with light of a wavelength of 400 nm or shorter.

4,966,666

FLUID ENERGIZING METHOD AND APPARATUS

James R. Waltonen, Salt Lake City, Utah, assignor to Waltonen Laboratories, Salt Lake City, Utah

PCT No. PCT/US86/02573, § 371 Date Jul. 18, 1988, § 102(e) Date Jul. 18, 1988, PCT Pub. No. WO88/03835, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 24, 1986, Ser. No. 237,918
Int. Cl.[5] B01J *19/08*; C01B *13/11*
U.S. Cl. 204—164 26 Claims



1. A method of energizing a fluid comprising:

providing a first and second electrode having a dielectric material interposed therebetween

introducing the fluid into a confined region located between an electrode and the dielectric material;

providing an electric discharge for energizing the fluid; and

focusing the electric discharge into the confined region with the dielectric material.

4,966,667

GEL TRANSFER PROCESS AND COMPOSITE

Donald B. Rising, Stow, and Rita Zimmerman, West Roxbury, both of Mass., assignors to Millipore Corporation, Bedford, Mass.

Filed Apr. 18, 1989, Ser. No. 340,107
Int. Cl.[5] G01N *27/26*; B01D *57/02*
U.S. Cl. 204—182.1 9 Claims

3. A gel composite useful in electrophoresis which comprises a cylindrically shaped gel and a multifilament thread extending through the length of said gel to provide projecting ends of said thread extending from opposite ends of said cylinder.

4,966,668

METHOD FOR THE TREATMENT OF METAL OBJECTS

Mauri K. Veistinen, Espoo, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 36,083, Apr. 9, 1987, abandoned. This application Nov. 29, 1988, Ser. No. 277,799
Claims priority, application Finland, May 7, 1986, 861898
Int. Cl.[5] C23C *14/00*
U.S. Cl. 204—192.31 15 Claims

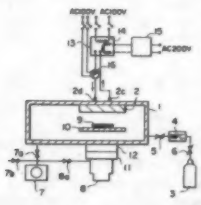
1. A method of treating a sintered permanent magnet having the composition $RE_2T_{14}B$, where RE is a rare earth metal, T is a transition metal and B is boron, comprising placing the magnet in a chamber, cleaning the magnet by sputtering, and applying a coating to the magnet by connecting the magnet and a body of metal that is in the chamber to a dc voltage source as cathode and anode respectively, establishing a pressure of about 10^{-3} mbar in the chamber, heating the magnet and concurrently heating the body of metal so that the metal evaporates and is deposited on the magnet.

4,966,669

VACUUM-FILM-FORMING APPARATUS AND METHOD

Masaaki Sadamori; Kenji Haze, and Tosinori Katamine, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 11, 1989, Ser. No. 392,552
Claims priority, application Japan, Dec. 20, 1988, 63-319484
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.12 6 Claims



3. A method of depositing a film on a substrate with material

transferred from a water-cooled target assembly disposed in a vacuum chamber, comprising:

evacuating the chamber to remove residual impurity gases while heating the target assembly with a flow of heated water; and

after the internal pressure within said chamber drops below a predetermined level, cooling the target assembly with a flow of cooled water and transferring material from the target assembly to the substrate disposed within said chamber to deposit said film on the substrate while the target assembly is being cooled by the cooled water.

4,966,670

ELECTROCHEMICAL CELL FOR MEASURING IONIC ACTIVITY IN A SOLUTION AND ITS METHOD OF USE

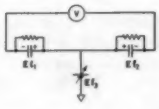
Claudio Calzi, Milan, Italy, assignor to Instrumentation Laboratory SpA, Milan, Italy

Filed Jun. 29, 1989, Ser. No. 373,899

Claims priority, application Italy, Jul. 8, 1988, 21293 A/88

Int. Cl.[5] G01N *27/416*

U.S. Cl. 204—406 **9 Claims**



1. An electrochemical cell for measuring the unknown specific ionic activity of a solution comprising at least two ion-selective electrodes, a first ion-selective electrode being in contact with a known solution of ionic activity which is standardized within a predetermined range, and a second ion-selective electrode being a measurement sensor; the known solution and an unknown solution being in mutual contact, the known solution having an ionic strength which is at least equal to that of the unknown solution, the electrochemical cell further comprising means for determining the potential of an electrolytic short circuit between the first ion-selective electrode in contact with the known solution and the second ion-selective electrode in contact with the unknown solution, the electrochemical cell also comprising a third electrode connected to remove current from the electrochemical cell.

4. An electrochemical cell as claimed in claim 1 further comprising two separate inlets and one common outlet for the two solutions, the known solution and the unknown solution coming into mutual ionic contact in a circumscribed zone in proximity to the outlet but sufficiently far from measurement chambers in which the first and second ion-selective electrodes are housed that disturbances due to diffusion between the known and unknown solutions during the time required for the measurement by the means for determining do not affect the measurement, with the known and unknown solutions being stationary during the measurement.

6. A standardization and measurement method comprising filling from both inlets to the common outlet the electrochemical cell claimed in claim 4 with a solution of known activity, making a first measurement with the measuring means, then introducing into one half of said cell from the second inlet to the common outlet a first unknown solution, and then making a second measurement with the measurement means.

4,966,671

METHOD AND APPARATUS FOR ELECTROCHEMICAL ANALYSIS

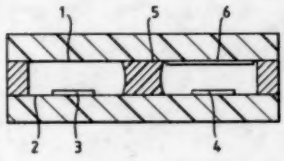
Claes I. Nylander, Linkoping, Sweden, and Ian W. Burns, Kimbolton, England, assignors to Unilever Patent Holdings, Rotterdam, Netherlands

Continuation of Ser. No. 106,955, Oct. 31, 1987, abandoned, which is a continuation of Ser. No. 925,557, Oct. 31, 1986, abandoned. This application Jun. 20, 1988, Ser. No. 208,806

Claims priority, application United Kingdom, Oct. 31, 1985, 8526902

Int. Cl.[5] G01N *27/46*

U.S. Cl. 204—153.14 **2 Claims**



1. A potentiometric electrochemical analysis method, which comprises placing by capillary action an aqueous sample liquid to be tested for the presence of a quantity of an analyte in said sample liquid, in each of two compartments of an electrochemical analysis cell, wherein the aqueous sample liquid so placed in each compartment is in electrochemical contact with one of two electrodes forming part of the cell, wherein the electrodes are insensitive to the analyte, and wherein the compartments are separated by an electroactive barrier which is sensitive to or selective for the analyte, said barrier not being in electrical contact with either electrode except through the medium of the sample liquid, said method further comprising changing the amount of the analyte material in a selected one of the compartments by adding thereto a predefined standard quantity of analyte, measuring the resulting cell potential and determining therefrom the concentration of analyte in the sample liquid being tested, the predefined standard quantity of analyte being allowed to dissolve in said sample liquid from a dry material being free from any electroactive material to which the electrodes are sensitive.

4,966,672

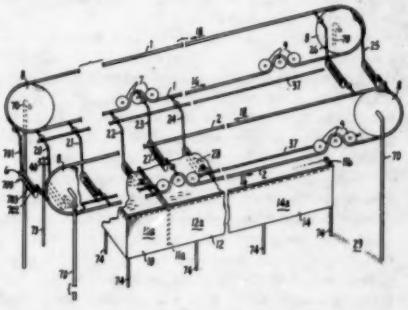
ELECTROLYTIC APPARATUS WITH UNEQUAL LEGGED BASKET-CARRIER

Boris Levit, and Michael A. C. Millerick, both of San Jose, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Aug. 26, 1988, Ser. No. 237,520

Int. Cl.[5] C25D *17/28, 17/16, 17/08;* B65G *17/20*

U.S. Cl. 204—198 **24 Claims**



1. A material handling apparatus, including:

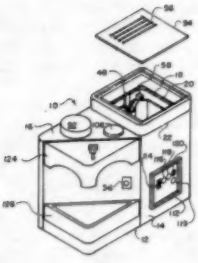
(a) a first drive chain oriented in a substantially vertical plane;
(b) a second drive chain oriented in a substantially vertical plane, and vertically offset from the first drive chain;
(c) a first rigid L-shaped bar, having a substantially vertical portion attached to the first drive chain and a substantially horizontal portion attached to the second drive chain; and
(d) a first carrier having a first basket portion for receiving a first part, said first carrier being attached to the first rigid L-shaped bar, wherein the first drive chain and the second drive chain are capable of rotating so as to translate the first rigid L-shaped bar, the first carrier, and the first part along a path in a substantially vertical plane, wherein the path includes a pair of vertically offset, generally horizontal elongated portions.

4,966,673

DEVICE FOR CLEANING AND POLISHING JEWELRY

Carlo Accattato, 15 McLaughlin Ave., West Haverstraw, N.Y. 10977

Filed Apr. 26, 1989, Ser. No. 343,803
Int. Cl.[5] C25F *7/00, 1/00, 3/00*
U.S. Cl. 204—224 M **18 Claims**



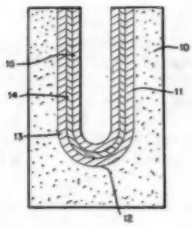
1. A jewelry cleaning arrangement comprising:
a housing;
a cleaning bath tank formed of an electrically conductive material, said cleaning bath tank being supported within said housing, being connectable to an electric potential and being fillable with fluid;
an electrical contact member extending sealingly into the interior region of said tank, said electrical contact member being electrically insulated from said tank and being connectable to an electric potential;
a non-conductive insert member positionable in said tank spaced from a bottom portion of said tank, said non-conductive insert member including a support surface;
jewelry engagement conductive means, supported by said non-conductive insert, said engagement means including a contact portion engaging said electrical contact member when said insert member is positioned within said tank, said jewelry engagement means for electrical conductive engagement with jewelry to be cleaned, whereby said cleaning tank is filled with a conductive fluid to allow electrolytic action between said tank and the jewelry to be cleaned.

4,966,674

CERIUM OXYCOMPOUND, STABLE ANODE FOR MOLTEN SALT ELECTROWINNING AND METHOD OF PRODUCTION

John G. Bannochie, Plymouth, Great Britain, and Robert C. Sherriff, Ingelheim-am-Rhein, Fed. Rep. of Germany, assignors to MOLTECH Invent S. A., Luxembourg

PCT No. PCT/EP87/00471, § 371 Date Jun. 2, 1989, § 102(e) Date Jun. 2, 1989, PCT Pub. No. WO88/01312, PCT Pub. Date Feb. 25, 1988
PCT Filed Aug. 19, 1987, Ser. No. 328,361
Claims priority, application European Pat. Off., Aug. 21, 1986, 86810374.8
Int. Cl.[5] C25C *7/02*
U.S. Cl. 204—290 R **9 Claims**



9. An aluminum-electrowinning anode comprising a core of conductive ceramic, a substrate layer of cerium oxyfluoride doped with one or more of tantalum or niobium in a concentration between 0.1–10 w % of the cerium, and at least one intermediate layer having a composition which is a mixture of the compositions of the core and the substrate layer.

4,966,675

POLARIZABLE ELECTRODE

Karl-Heinz Steininger, Otto Lowei Gasse 8, A-8042 Graz, Austria

Filed Mar. 15, 1989, Ser. No. 324,369
Claims priority, application Austria, Mar. 15, 1988, 703/88
Int. Cl.[5] C25B *11/04*
U.S. Cl. 204—290 R **13 Claims**

1. In a polarizable electrode in an electrolyte comprising a highly conductive electrical conductor, which is covered by an electrically conductive plastic sheath cover, the improvement wherein said sheath cover comprises at least two different layers including an inner predominantly nonpolar electrically conductive polymer layer directly adjacent said electrical conductor and an outer predominantly polar electrically conductive polyer, layer, said inner layer being composed of an electrically conductive plastic having a high stability to said electrolyte, said outer layer being in contact with said electrolyte and being composed of a different electrically conductive plastic fashioned to undergo a structural change by action of said electrolyte in the form of an increase in porosity, volume and surface area, and said inner and outer layers each to a

thickness of from 0.2 to 5 mm circumferentially completely surrounding said conductor.

4,966,676

SPUTTERING TARGET

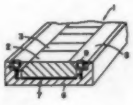
Yoshiharu Fukasawa; Satoshi Yamaguchi, and Hideo Ishihara, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 1, 1989, Ser. No. 345,175

Claims priority, application Japan, May 16, 1988, 63-118429

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—298.12 **14 Claims**



1. A sputtering target divided into respective target elements of two or more types arranged as a composite on a substrate, and a thin sheet consisting essentially of one or more of the materials of the target element interposed between said substrate and said target elements, wherein the thin sheet comprises at least one metal material.

4,966,677

CATHODE SPUTTERING APPARATUS ON THE MAGNETRON PRINCIPLE WITH A HOLLOW CATHODE AND A CYLINDRICAL TARGET

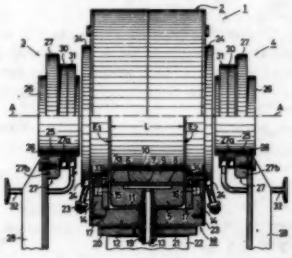
Hans Aichert, Hanau am Main; Rainer Gegenwart, Rodermark; Reiner Kukla, Hanau am Main; Klaus Wilmes, Bad Orb, and Jorg Kieser, Forchheim, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau am Main, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,244

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1988, 3844064

Int. Cl.[5] C23C *14/35, 14/56*

U.S. Cl. 204—298.210 **17 Claims**



1. Cathode sputtering apparatus having

(a) a hollow cathode on the magnetron principle with a cathode base having axially opposed end faces, at least one cooling passage and an inner cylindrical surface for receiving a hollow target with axially opposed end faces, an inner, likewise substantially cylindrical sputtering surface and a cylindrical outer surface, with a magnet system having magnet poles for the production of a rotationally symmetrical tunnel of magnetic lines of force closed on the circumference and over the sputtering surface,

(b) at least one anode substantially coaxial with the sputtering surface and lying axially outside of the space surrounded by the sputtering surface of the target, and

(c) having a transport path for a substrate to be coated running coaxially through the target and the at least one anode, characterized by the fact that

(d) the at least one cooling passage (6) is sealed off in the direction of the target (9) by a wall (7) of cylindrical inside surface (8) belonging to the cathode base (5),

(e) the tubular target (9) is inserted axially into the cylindrical inner surface (8) of the wall (7) with such tight clearance that the target (9) makes thermal contact with the wall no later than upon reaching its working temperature,

(f) the magnet system (18) comprises a rotationally symmetrical magnet yoke (12) concentric with the target (9) and radially inwardly pointing permanent magnets (15, 16), and annularly closed pole faces of opposite polarity (N, S) of which the north pole faces (N) are axially spaced from one end of the target (9) and the other pole faces (S) are axially spaced from the other end of the target and in the radial direction lie on a radius which is equal to or greater than the radius of the sputtering surface (10), and that

(g) the magnet system (18) is held by insulating spaces (11, 19, 20) at a freely adjustable potential in relation to the target (9) and the cathode base (5) on the one hand and the anode potential on the other.

4,966,678

COMPOSITIONS AND ELECTRODES COMPRISING ORGANOTIN IONOPHORES

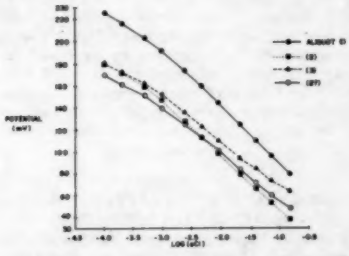
Christopher P. Moore, Middlesex, and Derek A. Thomason, Hertfordshire, both of England, assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 245,244, Sep. 16, 1988, abandoned. This application Jul. 19, 1989, Ser. No. 383,272

Claims priority, application United Kingdom, Oct. 14, 1987, 8724049

Int. Cl.[5] G01N *27/30*

U.S. Cl. 204—418 **14 Claims**



1. An ion sensitive electrode having an ion-sensitive membrane comprising an alkylthio substituted organotin having the following formula:

$$R_x^1Sn(SR^2)_{4-x}$$

or

$$R_y^1Sn(SR^3—X—R^3S)_{4-y}SnR^1$$

wherein

x is 0 or an integer from 1 to 3;

y is 2 or 3;

each R^1 independently is substituted or unsubstituted alkyl or substituted or unsubstituted aryl;

each R^2 independently is substituted or unsubstituted alkyl.

each R^3 independently is substituted or unsubstituted alkylene; and,

X is a single chemical bond or a linking group.

4,966,679

METHOD FOR HYDROCRACKING HEAVY FRACTION OILS

Junichi Kubo; Kiyoshi Kato; Tadakazu Yamashita; Masaru Sato, all of Yokohama, and Hiroshi Kato, Samukawa, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 128,812, Dec. 4, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,380

Claims priority, application Japan, Dec. 19, 1986, 61-301723; Dec. 19, 1986, 61-301724

Int. Cl.[5] C10G *65/12*

U.S. Cl. 208—58 **14 Claims**

1. In a method of hydrocracking a heavy fraction oil which consists of:

(1) introducing a starting heavy fraction oil containing at least 1 wt. % of asphaltene (pentane-insoluble ingredients), a hydrogen donating liquid solvent and a hydrogen containing gas into a cracking reactor, said reactor having at least one vertical partition whereby said reactor is divided into at least two parts, solid catalyst being placed into one of said parts in a total amount of 20% by volume of the interior of the cracking reactor, said parts communicate with each other at the upper and lower ends of the interior of said reactor, and the liquid comprising said oil and solvent interiorly circulates at a linear velocity of at least 2 cm/sec. around at least said one partition;

(2) the improvement which comprises cracking the starting heavy fraction oil at a liquid hourly space velocity of not higher than 1 (hr^{-1}) while adding hydrogen in such an amount that the amount of hydrogen consumed is at least 1 volume of hydrogen per volume of cracked product whereby the formation of toluene-insoluble carbonaceous substances and precursors thereof in the cracking reactor is inhibited;

(3) passing the liquid and gases from the cracking reactor to a hydrogenating reactor holding therein at least 50 vol. %, based on the interior of the hydrogenating reactor, of a solid catalyst in the form of a fixed bed and maintained at a lower temperature than the cracking reactor and then;

(4) hydrogenating the thus passed materials at liquid hourly space velocity of not higher than 0.5 (hr^{-1}) while adding hydrogen to the hydrogenating reactor in such an amount that the amount of consumed hydrogen is 5–170 volumes (Nm^3) per volume of cracked product, whereby the toluene-insoluble carbonaceous substances and precursors thereof are co.verted to toluene-soluble materials.

4,966,680

INTEGRATED CATALYTIC CRACKING PROCESS WITH LIGHT OLEFIN UPGRADING

Amos A. Avidan, Yardley, and Sergei Yurchak, Media, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

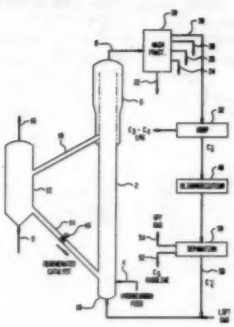
Filed May 31, 1988, Ser. No. 200,109

Int. Cl.[5] C10G *57/02*

U.S. Cl. 208—71 **8 Claims**

4. In a fluid catalytic cracking process comprising admixing a hydrocarbon oil feed with hot regenerated catalyst in a bottom portion of a reactor riser with a light hydrocarbon lift gas, passing the mixture of the hydrocarbon oil feedstock, catalyst and lift gas through the riser, thereby volatilizing the oil feed and effecting cracking thereof at the process temperature under endothermic process conditions and deactivating the catalyst by deposition of carbonaceous deposits thereon, separating the deactivated catalyst from the cracked hydrocarbonaceous feed, passing the deactivated catalyst to a regenerator vessel wherein the carbonaceous deposits are removed from the deactivated catalyst under exothermic process conditions by means of a regenerating medium introduced into the regenerator vessel, and passing the regenerated hot catalyst substantially above process cracking temperature to the bottom section of the reactor riser; the improvement comprising

separating and recovering cracked liquid hydrocarbons in a main fractionator to separate effluent from catalytic cracking of hydrocarbon feedstock to provide liquid cracking product and a light gas stream comprising C_2-C_4 olefinic and paraffinic gases;



contacting the olefin-containing gases in an olefin upgrading reactor with a fluidized bed of medium pore zeolite oligomerization catalyst particles under oligomerization reaction conditions to convert said olefins to gasoline range hydrocarbons and a C_4- byproduct gas stream rich in saturated hydrocarbons; and

passing at least a portion of said byproduct saturated gas stream to the bottom of the cracking reactor riser as a lift gas.

4,966,681

MULTIPLE RISER FLUIDIZED CATALYTIC CRACKING PROCESS UTILIZING A C_3–C_4 PARAFFIN-RICH CO-FEED AND MIXED CATALYST SYSTEM

Joseph A. Herbst, Turnersville; Hartley Owen, Belle Mead, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 144,788, Jan. 21, 1988, abandoned, which is a continuation of Ser. No. 903,161, Sep. 3, 1986, abandoned. This application Mar. 30, 1989, Ser. No. 332,418

Int. Cl.[5] C10G *57/00*

U.S. Cl. 208—74 **12 Claims**

1. A catalytic cracking process undertaken in at least two risers, said two risers being in communication with each other via a catalyst regeneration zone, which process comprises,

providing a first catalyst component as particles which have a first settling rate and

providing a second catalyst component as particles which have a second settling rate, which second catalyst component comprises a medium pore zeolite,

wherein said first settling rate is different from said second settling rate, wherein settling rate is a function of a physical property selected from the group consisting of density, particle size and shape;

cracking a feed which is a gas oil or a resid in a first of said two risers, in the presence of particles of said first catalyst component selected from the group consisting of an amorphous cracking catalyst and a large pore crystalline cracking catalyst at 980° to 1050° F.; and separating products of cracking from catalyst in a stripper;

thermally and catalytically cracking C_3–C_6 paraffin rich charge material introduced to a second riser of said two risers in a lower region of said second riser to produce a product mixture comprising propylene, butylene, ethylene and hydrogen; wherein the heat for thermally and catalytically cracking said charge material is provided by regen-

erated catalyst from the regenerator which is conveyed to the lower region of said second riser;

passing, from the stripper, particles of said second catalyst component, to downstream of said lower region and

passing said product mixture downstream of said lower region of said second riser wherein said product mixture downstream of said lower region is contacted with particles of said medium pore zeolite, to reduce temperature in an upper zone of said second riser,

contacting said product mixture with the medium pore zeolite in said upper zone of said second riser to convert said product mixture to high octane gasoline comprising aligomers of said ethylene, propylene and butylene;

separating said high octane gasoline from said medium pore zeolite;

separating particles of said medium pore zeolite from particles of said first catalyst component in said stripper,

wherein a difference between said first settling rate and said second settling rate allows said separating said medium pore zeolite from said first catalyst component; and

passing the separated medium pore zeolite from said stripper to said downstream of said lower region and passing separated particles of first catalyst component to the regenerator; and

passing from the regenerator regenerated catalyst to the lower region of said second riser.

4,966,682

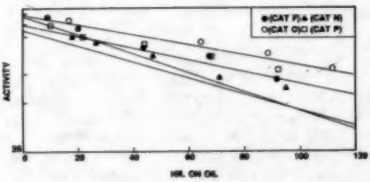
REFORMING WITH MODIFIED ALUMINA CATALYSTS

William C. Baird, Jr., Baton Rouge, La., and Ehsan I. Shoukry, Brights Grove, Canada, assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jul. 3, 1989, Ser. No. 375,221

Int. Cl.[5] C10G *35/085*

U.S. Cl. 208—139 **12 Claims**



1. In a process for catalytic reforming, in the presence of hydrogen, a naphtha feed at reforming conditions, the improvement which comprises contacting said feed with a catalyst comprised of about 0.01 to 2 wt. % platinum, up to 2 wt. % rhenium, and up to 2 wt. % iridium on a support comprised of alumina and a modifier comprised of at least about 100 wppm of Si and at least about 10 wppm of one or more alkaline earth metals selected from Ca, Mg, Ba, and Sr, wherein the total concentration of modifier does not exceed about 5000 wppm.

4,966,683

PROCESS FOR THE REMOVAL OF MERCURY FROM NATURAL GAS CONDENSATE

Costandi A. Audeh, Princeton, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Apr. 27, 1989, Ser. No. 343,658

Int. Cl.[5] C01G *13/00*; C07C *7/148*; C10G *29/02*

U.S. Cl. 208—251 H **18 Claims**

1. A process for the removal of mercury from natural gas condensate comprising the steps of:

mixing elemental sulfur with said natural gas condensate,

passing said mixture of natural gas condensate and elemental sulfur over a catalyst in a reactor, and

simultaneously passing hydrogen gas over said catalyst.

4,966,684

PROCESS FOR THE REMOVAL OF MERCURY FROM NATURAL GAS CONDENSATE

Costandi A. Audeh, Princeton, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Apr. 27, 1989, Ser. No. 343,659

Int. Cl.[5] C01G *13/00*; C07C *7/148*; C10G *29/02*

U.S. Cl. 208—251 H **15 Claims**

1. A process for the removal of mercury from natural gas condensate comprising the steps of:

passing said natural gas condensate over a catalyst in a reactor vessel and

simultaneously passing a mixture of methane and hydrogen sulfide over said catalyst.

4,966,685

PROCESS FOR EXTRACTING OIL FROM TAR SANDS

Jerry B. Hall, 4150 Russell, NW., Cedar Springs, Mich. 49319, and Anthony Russo, 6995 Festival Dr., SW., Grand Rapids, Mich. 49508

Filed Sep. 23, 1988, Ser. No. 248,996

Int. Cl.[5] C10G *1/04*

U.S. Cl. 208—390 **18 Claims**

1. A process for the extraction of oil and bitumen fractions from tar sands comprising the steps of:

heating the tar sands within the range of about seventy degrees Fahrenheit (70° F.) to about one hundred fifty five degrees Fahrenheit (155° F.);

mixing the mined tar sands with an aqueous solution of water soluable separation chemicals that induce separation of the oil and bitumen from the sand under such temperature conditions, the chemicals being such that they also induce separation of the oil and bitumen from the water and separation chemicals, the separation chemicals comprising an aqueous solution of an effective amount of water conditioner, wetting agents and a coupling agent selected from the group consisting of sulfonated fatty acid salts;

holding the mined tar sands and the separation chemicals for a sufficient period of time under sufficient quiescent conditions that the oil and bitumen become substantially separated from the sands, the separated oil and bitumen floating on the water and the sand sinking in the water;

segregation of the oil or bitumen fractions from the water and separation chemicals and retention of the fractions for use as a chemical resource.

4,966,686

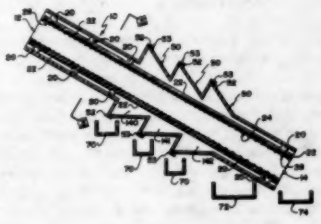
FINE METAL RECOVERY APPARATUS

Marvin Sherman, Whitehorse, Canada, assignor to Wilson Creek Placer Ltd., Whitehorse, Canada

Filed Feb. 16, 1988, Ser. No. 155,825

Int. Cl.[5] B07B *1/22*, *1/46*

U.S. Cl. 209—255 **7 Claims**



1. An apparatus for the recovery of fine metals comprising a tiltable, rotatable cylinder having an inlet and an outlet, a mesh positioned circumferentially around and separated a predetermined distance from the inside circumference of said cylinder,

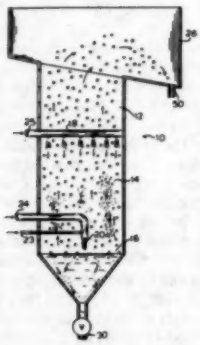
a first recovery ring located downstream from said inlet said first recovery ring comprising a truncated conically shaped annular ring about the circumference of the cylinder having a first side extending outwardly substantially perpendicular of said cylinder merging with a second side angled inwardly toward and merging with said cylinder downstream from said first side, said first recovery ring having an inside diameter greater than the inside diameter of said cylinder, and releasing means extending from the inside diameter of said first recovery ring to the outside periphery of said first recovery ring for releasing the contents of said recovery ring.

4,966,687

METHOD AND APPARATUS FOR COLUMN FLOTATION OF MINERAL MATTER

Richard D. Trigg, Glenolden, Pa., assignor to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 19, 1985, Ser. No. 810,864
Int. Cl.[5] B03D *1/14, 1/00, 1/02*
U.S. Cl. 209—164 **8 Claims**



1. A method for the separation of the components of a slurry of ore by froth flotation in a vertically aligned, elongated zone having an upper section, an intermediate section and a lower section, said method comprising the steps of:

(i) introducing an aerated particulate aqueous slurry of ore into said lower section of said vertically aligned, elongated zone and above the level of a liquid medium contained in said lower section of said vertically aligned, elongated zone thereby creating a froth containing mineral matter and establishing and maintaining an upwardly moving stream of said froth; and

(ii) establishing and maintaining a downwardly flowing stream of aqueous medium within said intermediate section of said vertically aligned, elongated zone and above said level of liquid medium in said lower section of said vertically aligned, elongated zone thereby enhancing drainage of said upwardly moving stream of said froth.

7. Apparatus for the separation of components of a slurry of ore by froth flotation, said apparatus comprising:

(i) a flotation column having an upper section, an intermediate section and a lower section, said lower section adapted to contain a liquid medium at a predetermined level;

(ii) means provided in said intermediate section of said flotation column above said predetermined level of said liquid medium for introducing and providing a downwardly flowing stream of aqueous medium in said intermediate section of said flotation column;

(iii) at least one spray nozzle provided in said lower section of said flotation column and above said predetermined level of said liquid medium; and

(iv) means for introducing air to said at least one spray nozzle;

wherein said means for introducing and providing a downwardly flowing stream of aqueous medium is comprised of an elongated bar extending horizontally into said intermediate section of said flotation column and adapted to provide a downwardly directed fine mist spray.

4,966,688

ORE FLOTATION EMPLOYING AMINO MERCAPTOTHIADIAZOLES

M. D. Bishop, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 23, 1988, Ser. No. 210,888
Int. Cl.[5] B03D *1/01, 1/012*
U.S. Cl. 209—167 **20 Claims**

1. A process for recovery of minerals comprising:

(a) mixing ore, which has been sufficiently crushed for use in an ore flotation process, containing said minerals, water, and a sufficient amount of an amino mercaptothiadiazole to depress a portion of said minerals, said amino mercaptothiadiazole having the formula:

wherein M is selected from the group consisting of hydrogen and alkali metal atoms, to establish a pulp;

(b) aerating said pulp to produce a froth containing a concentrate portion of said minerals while allowing a tail portion of said minerals to be depressed in said pulp; and

(c) recovering said concentrate portion from said froth and recovering said tail portion of said minerals from said pulp.

4,966,689

SELF-CLEANING GRATE ASSEMBLY

Rick Wark, 2217 N. Lk. Angelus Rd.; Philip H. Christos, 2817 Silverstone, both of Pontiac, Mich. 48055, and Karl M. Williamson, 27356 Maywood, Roseville, Mich. 48066

Continuation of Ser. No. 17,468, Feb. 20, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 298,864
Int. Cl.[5] B07B *1/50*
U.S. Cl. 209—384 **11 Claims**

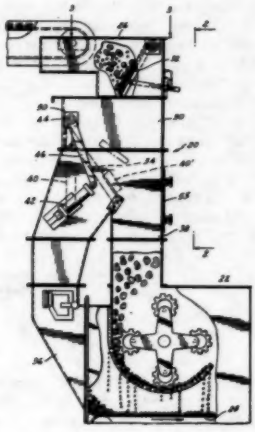
1. A self cleaning sizing grate assembly for granular material such as coal or the like comprising:

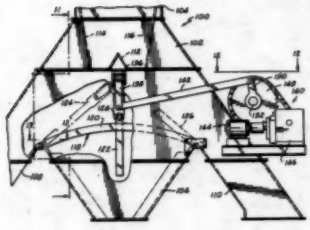
a housing having a generally vertical inlet chute for receiving granular material, a lower outlet providing a fines chute for granular material smaller than the predetermined size, and an exit chute for material greater than the predetermined size;

a grate affixed to the housing through which material entering the fines chute must pass, said grate further comprising a plurality of parallel, spaced-apart grate bars defining a grate surface having a plurality of parallel openings formed therein;

a comb cooperating with the housing and the grate and movable relative thereto during a cleaning cycle to clear material lodged between the grate bars, said comb further comprising a support shaft pivotably attached to the housing and a plurality of comb bars cantileveredly affixed to said shaft and projecting perpendicular thereto arranged to fit between the openings between the grate bars, wherein said comb projects through the grate surface at a point of intersection and, is shiftable between a normal position and a cleaning position upon the rotation of the shaft causing the point of intersection of the comb bars and the grate surface to sequentially advance, traversing

the grate before returning to the normal position at the completion of the cleaning cycle; and





drive means for periodically rotating the comb shaft to cause the comb to move in an oscillating manner to clean the grate surface.

4,966,690

CHLORINE INDUCTION APPARATUS FOR TREATMENT OF WASTEWATER

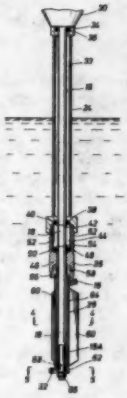
Jack C. Gardiner, 8919 Bold Forest, Houston, Tex. 77088, and Russell P. Holland, II, 2227 River Ford Dr., Kingwood, Tex. 77339

Continuation of Ser. No. 115,172, Oct. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 783,128, Oct. 2, 1985, abandoned. This application Jun. 21, 1989, Ser. No. 370,149

Int. Cl.[5] C02F *1/76*

U.S. Cl. 210—86 **28 Claims**

1. Apparatus for use in treating wastewater with a disinfectant, comprising: a generally tubular bearing frame including an upper bearing housing, a lower bearing housing, and a tubular member extending between said housings; a drive shaft extending axially through said bearing frame and sized to provide a first annular chamber between said shaft and the inner wall of said tubular member; means for coupling the upper end of said shaft to a drive motor; an upper bearing member in said upper housing for rotatably supporting said drive shaft; a lower bearing member in said lower housing for rotatably supporting said drive shaft; a seal housing connected to the lower end of said lower housing; a seal assembly mounted in said seal housing for preventing passage of wastewater and disinfectant along said shaft toward said lower bearing member and for containing a supply of lubricating oil in said annular chamber; a short-length vacuum tube connected to said seal housing and extending downwardly thereof, said vacuum tube having an open lower end, there being a second annular space formed between said shaft and the inner wall of said vacuum tube; connection means for permitting a supply of disinfectant to be sucked into said vacuum tube above said open lower end; and propeller means attached to the lower end of said drive shaft in a position such that the upper surfaces of the blades of said propeller means are positioned closely adjacent said lower open end of said vacuum tube, whereby rotation of said propeller means causes wastewater to flow at high velocity downward past said open lower end to create a low pressure region within such open lower end that sucks disinfectant through said second annular space and out of said open lower end into mixing contact with the wastewater.



4,966,691

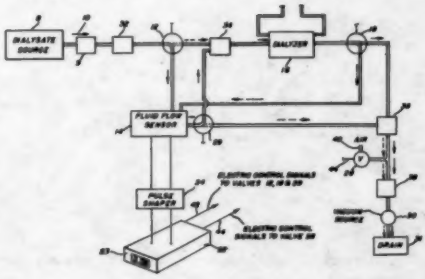
MEASUREMENT AND CONTROL OF ULTRAFILTRATION IN DIALYSIS

Donald W. Brous, P.O. Box 151, Manchester, N.H. 03105-0151

Continuation-in-part of Ser. No. 75,536, Jul. 20, 1987, abandoned. This application May 15, 1989, Ser. No. 351,220

Int. Cl.[5] B01D *61/34*

U.S. Cl. 210—87 **5 Claims**



1. A system for measurement and control of ultrafiltration in dialysis comprising

a dialyzer,

a drain,

a source of dialysate,

means to cause dialysate to flow in the system,

a sensor for measuring rate of flow,

a first input flow path for conducting dialysate from said source to said sensor nd thence to said dialyzer,

a second input flow path for conducting dialysate from said source directly to said dialyzer,

a first output flow path for conducting dialysate and ultrafiltrate from said dialyzer to drain,

a second output flow path for conducting dialysate and ultrafiltrate from said dialyzer to said sensor and thence to drain,

a first control valve means in said first and second input flow paths for selectively directing flow of dialysate into said sensor or directly into said dialyzer,

a second control valve means in said first and second output flow paths for selectively directing flow of dialysate and ultrafiltrate to drain or to said sensor,

a third control valve means downstream of said sensor in said first input flow path and in said second output flow path for selectively directly flow from said sensor to said dialyzer or to said drain,

said sensor generating an electric signal representing the fluid flow rate measured by said sensor,

a computer having means for alternately controlling said first, second and third control valves means to direct fluid to flow first through said first input flow path into said dialyzer through said sensor, and out of said dialyzer to drain through said first output flow path for a predetermined first interval, and secondly to direct fluid flow through said second input flow path directly to said dialyzer and from said dialyzer through said second output flow path to said sensor and thence to drain for a second predetermined interval,

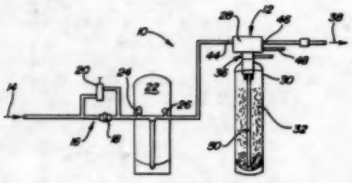
said computer also having means for sampling the electric signals from said sensor during said first and second intervals, storing said electric signals and comparing the flow rates measured during said first and second intervals and producing a display of differential between the higher and lower flow rates, said differential representing the flow rate of ultrafiltrate from said dialyzer.

4,966,692

FILTRATION SYSTEM HAVING FLOW CONTROL MEANS AND TANK ADAPTER WITH SELECTIVE VENTING

Douglas E. Overy, Auburn, Ind., assignor to Flint & Walling, Inc., Kendallville, Ind.

Filed May 5, 1989, Ser. No. 348,345
Int. Cl.[5] B01B *24/18*
U.S. Cl. 210—123 **22 Claims**



20. A system for removing contaminants from a water supply comprising:

means for entraining a controlled quantity of air into the water to oxidize the contaminants in the water;

a filtration tank having flow control means to control fluid flow through said tank, said control means including a fluid inlet to receive the water from said air entraining means and a fluid outlet to deliver filtered water to service; and

an adapter received within a neck opening of said tank, said adapter receiving said flow control means, said adapter including means for selectively venting accumulated gases from said filtration tank;

said filtration tank having a filter bed for filtering contaminants from the water and means for backwashing said filter bed to dispose of accumulated contaminants, the water flowing through said flow control means into said tank, through said filter bed to remove contaminants from the water, and from said filtration tank through said fluid outlet of said control means; and

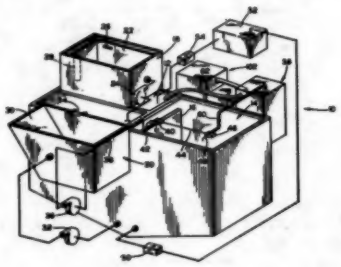
said adapter including at least one fluid passageway in fluid communication with said flow control means of said filtration tank and means for receiving a stand pipe of said flow control means extending into said filter bed, fluid flowing through said at least one fluid passageway and said stand pipe in a first direction during normal operation of the system and flowing through said at least one fluid passageway and said stand pipe in a second direction during backwash of the system, said flow control means controlling fluid flow through said at least one fluid passageway and stand pipe.

4,966,693

APPARATUS FOR PROCESSING COOLANT

Robert H. Brandt, Pemberville, and Merlin P. Hoodlebrink, Bradner, both of Ohio, assignors to Brandt & Associates, Inc., Pemberville, Ohio

Division of Ser. No. 279,763, Dec. 5, 1988, Pat. No. 4,895,649. This application Oct. 27, 1989, Ser. No. 427,571
Int. Cl.[5] B01D *61/08, 61/18*
U.S. Cl. 210—195.2 **9 Claims**



1. A coolant processing system comprising means for providing the option of selecting the extent of contaminant removal from contaminated coolant to meet preselected discharge requirements, said system including, a coalescing unit for removing free oil from coolant, a filtering unit for removing particles from coolant, an ultrafiltration unit for removing contaminants from spent coolant, and a reverse osmosis unit for removing additional contaminants from the spent coolant.

4,966,694

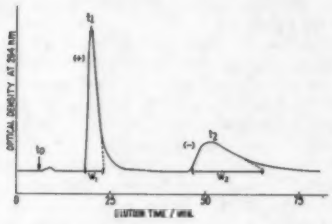
SEPARATION AGENT COMPRISING ACYL- OR CARBAMOYL-SUBSTITUTED POLYSACCHARIDE

Hajime Namikoshi; Tohru Shibata, and Ichiro Okamoto, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Division of Ser. No. 246,449, Sep. 19, 1988, Pat. No. 4,879,038, which is a continuation-in-part of Ser. No. 716,791, Mar. 27, 1985, abandoned. This application May 30, 1989, Ser. No. 358,895
Claims priority, application Japan, Mar. 29, 1984, 59-59365
Int. Cl.[5] B01D *15/08*
U.S. Cl. 210—198.2 **2 Claims**

2. A separating agent which comprises a carrier having a particle size of 1 micron to 10 mm and a pore size of 10 A to 100 microns and a polysaccharide derivative having 30–100%

of the hydroxyl groups thereof substituted with a substituent



selected from the group consisting of an acyl group of the formula (1):

(1)

wherein R represents an atomic group having a nucleus comprising a conjugated pi-bond system in which the number of bonds interposed between (1) a first atom contained in said atomic group and bonded with the carbonyl and (2) a second atom contained in the pi-bond system and most distant from said first atom is at least 5 by the shortest route, wherein said polysaccharide derivative is cellulose tri-β-naphthoate.

4,966,695

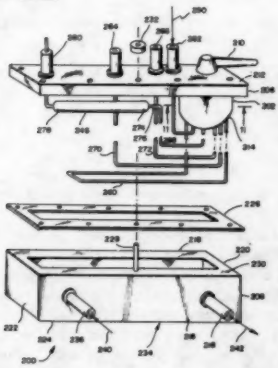
HIGH PRESSURE LIQUID CHROMATOGRAPHY COLUMN JACKET

Henry Joshua, 256 Woodward Ave., Staten Island, N.Y. 10314

Continuation-in-part of Ser. No. 152,328, Feb. 4, 1988, abandoned. This application May 3, 1989, Ser. No. 346,782

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **17 Claims**



1. A high pressure liquid chromatography column apparatus comprising

open container means,

removable cover means proportioned to fit said container means,

sealing means capable of forming a liquid-tight seal between said container means and said cover means, thereby forming enclosure means,

attachment means for removably attaching said cover means and said container means,

a pair of hose connection means mounted on said enclosure, at least one pair of tubing seal fittings mounted on said enclosure means,

a chromatographic column means connected to said tubing seal fittings, said tubing seal fittings being mounted on said cover means, and a source of thermally controlled fluid for flowing through said hose connection means.

4,966,696

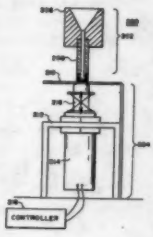
METHOD OF MAKING A FRIT

Robert W. Allington; Abolghassem Y. Tehrani, and John N. Jones, all of Lincoln, Nebr., assignors to Isco, Inc., Lincoln, Nebr.

Continuation of Ser. No. 104,248, Oct. 8, 1987, abandoned, which is a division of Ser. No. 745,512, Jun. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 585,298, Mar. 1, 1984, Pat. No. 4,545,904. This application Jun. 16, 1989, Ser. No. 368,112

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **2 Claims**



2. A method of making a frit comprising the steps of:

obtaining a plurality of relatively small particles, said particles containing at least two materials having an eutectic temperature and a temperature of immisibility;

placing said particles in an opening in a sleeve to form a shape having a larger top than a bottom;

heating said particles to a temperature sufficiently high to cause them to bind to each other and to the walls of said opening in said sleeve; and

said step of heating said fixture including the step of heating said fixture to a temperature between said temperature of phase-immisibility and said eutectic temperature.

4,966,697

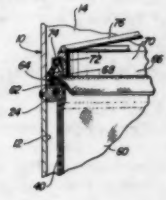
FLUID FILTER RETAINING DEVICE

Nils N. Rosaen, 3333 Hilton Estates, Brighton, Mich. 48116

Filed Jun. 13, 1989, Ser. No. 365,676

Int. Cl.[5] B01D *29/13*

U.S. Cl. 210—232 **3 Claims**



1. A filtering device for use with a fluid flow system, said filtering device comprising:

a housing having an axially extending interior chamber, an open top, said housing having an inlet and an outlet open

to said chamber, said inlet connected to said fluid flow system;

said housing having a seat formed within said chamber at a position spaced downwardly from said open top, said seat extending radially into said chamber and having an annular surface;

a cover member detachably mounted to said housing to extend over said open top;

means for detachably mounting said cover to said housing; and

a filter unit removably insertable into said chamber through said open top to a filtering position in which said filter unit is positioned between said inlet and said outlet, said filter unit having a filter element with a continuous flange portion in abutment with said seat, a filter liner having a flared top portion and an elongated portion, said elongated portion being positioned within said filter element with said flared portion positioned between said flange, and a biasing means, said biasing means comprising a retaining ring member and a spring member mounted to said retaining ring member, said retaining ring member being positioned in abutment with said flared portion of said filter liner to maintain said filter liner and filter element in position against said seat.

4,966,698

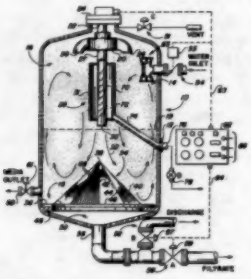
FILTER SYSTEM AND SCRUBBER

Clifford J. Hensley, 4820 E. University, Odessa, Tex. 79762

Division of Ser. No. 100,573, Sep. 24, 1987, Pat. No. 4,826,609, which is a continuation-in-part of Ser. No. 1,912, Jan. 9, 1987, Pat. No. 4,787,987. This application Mar. 30, 1989, Ser. No. 331,213

Int. Cl.[5] B01D *23/24*

U.S. Cl. 210—269 **18 Claims**



1. A filter system for removing contaminants from a liquid flowing therethrough comprising a vessel having an inlet for providing a contaminated liquid flow into one end thereof and a clean liquid outlet through which filtered liquid can exit said vessel; a first screen supported adjacent said clean liquid outlet and within said vessel;

a quantity of particulate filter media in said vessel received against said screen for normal filter operation wherein contaminants are captured by said particulate filter media and filtered as liquid flows through said screen and then exits through said clean liquid outlet; and,

an intermittently operable scrubber apparatus connected to the interior of said vessel such that said particulate filter media can be fluidized and thereby cleaned while said particulate filter media remains predominately within said vessel, said scrubber apparatus including:

a pump means having a suction inlet in said vessel for receiving flow of liquid from the interior of said vessel and a pump outlet arranged within said vessel directed toward said screen, said pump outlet being aligned in a manner such that said particulate filter media and any liquid contained upstream of the screen assumes a flow path which scrubs the particulate filter media and translocates any removed contaminants from the particulate filter media into the liquid;

a scrub water outlet formed in said vessel; a length of said pump outlet being perforate and thereby forming a scrub water screen through which liquid and removed contaminants can flow while the filter media is substantially precluded from flowing therethrough; a scrub water discharge chamber formed contiguous respective to said scrub water screen and connected to discharge contaminants and liquid from said discharge chamber through said scrub water outlet; whereby, liquid containing contaminants scrubbed from said particulate filter media is directed through said pump, through said scrub water screen, into said discharge chamber, and from said vessel by means of said scrub water outlet.

4,966,699

HOLLOW FIBER MEMBRANE FLUID PROCESSOR

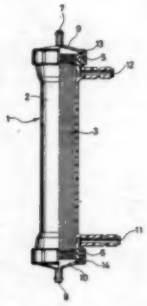
Masatomi Sasaki; Hirotomo Morita, both of Fuji, and Yutaka Matsumoto, Fujinomiya, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 10, 1989, Ser. No. 335,543

Claims priority, application Japan, May 25, 1988, 63-129363

Int. Cl.[5] B01D *61/28*

U.S. Cl. 210—321.8 **10 Claims**



1. A hollow fiber membrane blood processing apparatus comprising

a housing having opposed open ends,

a fiber bundle received in said housing and including a plurality of hollow fiber membranes for processing fluid,

partitions fluid tightly securing the opposed ends of the fiber bundle to the corresponding ends of said housing, a space being defined by the outer surface of said hollow fiber membranes, the inner surface of said housing, and the partitions,

an inlet and an outlet for a blood processing fluid disposed in said housing adjacent the opposed ends thereof in fluid communication with the space, and

an inlet and an outlet for blood disposed at the opposed ends of said housing in fluid communication with the interior of the hollow fiber membranes,

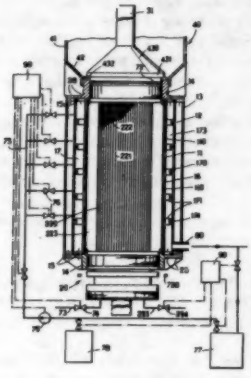
characterized in that only the portion of said hollow fiber membranes in the vicinity of where the members are in contact with each of said partitions has been treated with a reagent having a reactive group capable of reaction with a polar group that the hollow fiber membranes possess or a material contained in the hollow fiber membranes possesses.

4,966,700

APPARATUS FOR SEPARATING INTO ITS TWO PHASES A SUBSTANCE CONSISTING OF SOLID MATTER SUSPENDED IN A LIQUID

Ernö Pall, 3 Lotissement Le Colombé , Frontigny - 57420 Verny, France

Filed Jun. 16, 1989, Ser. No. 367,039
Int. Cl.[5] B01D *35/00*
U.S. Cl. 210—386 29 Claims



1. Apparatus comprising: means for separating into its two phases a substance consisting of solid matter suspended in a liquid and for recovering them separately in the compacted state with a high dry-matter content and in the liquid state practically free from solid matter, including,

an external unit and an internal unit, said external unit comprising a body permeable with respect to the liquid and impermeable with respect to the solid matter, said external and internal units having a common axis and symmetry of revolution and being axially movable relative to each other in a direction parallel to their common axis, and said external and internal units defining enclosure means for receiving the substance to be treated and also defining chamber means for receiving the liquid separated from the substance in said enclosure means, said chamber means and said enclosure means being separated by said body,

expandable impervious elastic membrane means for reducing the volume of said enclosure means for expelling from said enclosure means the liquid of the substance from said enclosure means into said chamber means and for pressing the solid matter against said body;

scraper means for detaching the solid matter pressed against said body so that the solid matter can be collected separately;

vertical central guide means for directing the relative displacements of said external unit and said internal unit along their common axis; and

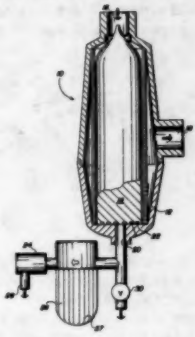
hopper means for supplying said enclosure means with the substance to be treated, said hopper means being mounted on top of and fixed to said external unit, said hopper means including closing means for closing said hopper means at the bottom end thereof, said closing means being centered on said guide means.

4,966,701

FILTER

Geoffrey Goodman; Uri Cagan, both of Kibbutz Amiad, Israel, and Yitzhak Orians, Los Angeles, Calif., assignors to Amiad U.S.A., Inc., Van Nuys, Calif.

Filed Dec. 6, 1989, Ser. No. 446,528
Claims priority, application Israel, Jul. 28, 1989, 091150/2
Int. Cl.[5] B01D *29/37*
U.S. Cl. 210—419 6 Claims



1. In a filter for separating solids from liquids, with means for the reduction of the accumulation of solids within the filter and with automatic means for the continuous separation and removal at reduced pressure of liquid-entrained solids during filter operation, The Improvement comprising: means for providing operation of said filter for substantially extended periods of time while inhibiting clogging of said filter, including:

a housing provided with an inlet for the liquid to be filtered, and provided with a first outlet for filtrate and with a second outlet for liquid containing a high concentration of solids;

a hollow filter element insertable into said housing, the internal side of said filter element being in fluid connection with said inlet and the external side of said filter element being in fluid connection with said first outlet;

a volume reduction device inserted in said filter element and being of a size to occupy a major portion of the hollow of said filter element;

a pressure reduction device in fluid connection with said second outlet, and provided with discharge means for solids and for the liquid in which they are entrained.

4,966,702

MULTIPLE-DISC TYPE FILTERS

Mordeki Drori, 89 Zahal Street, Kiron, Israel

Continuation of Ser. No. 140,118, Dec. 31, 1987, Pat. No. 4,844,806, Continuation of Ser. No. 77,873, Jul. 27, 1987, Pat. No. 4,751,000, which is a continuation of Ser. No. 709,372, Mar. 7, 1985, Pat. No. 4,683,060. This application Apr. 13, 1989, Ser. No. 337,744
Claims priority, application Israel, Dec. 24, 1984, 73923
The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.
Int. Cl.[5] B01D *29/46*
U.S. Cl. 210—448 2 Claims

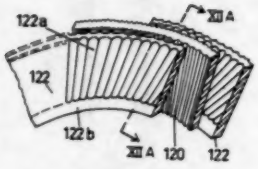
1. A filter including a housing having an inlet connectable to an upstream pipe, and an outlet connectable to a downstream pipe; and a stack of discs disposed within said housing for separating solid particles from a fluid flowing between said discs from the upstream side of said stack to the downstream side thereof; characterized in that said stack includes:

a plurality of filter discs having a large surface area of their side faces formed with grooves;

and a spacer member interposed between each pair of adjacent filter discs;

said spacer members having surfaces contacting only a portion of the grooved faces of the filter discs leaving a portion of the grooved faces of the filter discs on the upstream side of the stack not contacted by the spacer members, to thereby form:

(a) compartments on the upstream side of the stack for accumulation of solid particles which settle in said grooves; (b) edge filtering passageways along the upstream edges of



the spacer members in contact with the grooved faces of the filter discs, which passageways define the size of particles separated by the filter; and

(c) further filtering passageways of large surface area in said compartments, said latter passageways extending between the particles settling in the grooves in said compartments and through the grooves to the downstream side of the stack,

wherein said spacer members are of annular configuration, and said filter discs inlcude grooves extending generally in the radial direction such that the fluid flow through said edge-filtering and further filtering passageways is generally in the radial direction of said filter discs.

4,966,703

CYCLONE SEPARATOR

Charles M. Kalnins, Malvern; Phillip C. Tuckett, Berwick, and Soren R. Z. Hansen, Dandenong, all of Australia, assignors to Conoco Specialty Products Inc., Houston, Tex.

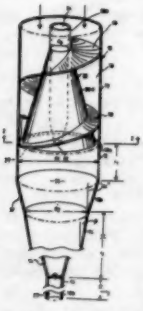
PCT No. PCT/AU88/00456, § 371 Date Aug. 7, 1989, § 102(e) Date Aug. 7, 1989, PCT Pub. No. WO89/04726, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 24, 1988, Ser. No. 392,969

Claims priority, application Australia, Nov. 24, 1987, 15571/87

Int. Cl.[5] B01D *21/26, 19/20*

U.S. Cl. 210—512.1 **15 Claims**



1. A cyclone separator for separating two liquid components one of greater density and the other of lesser density, one from the other, when admitted in admixture to a separating chamber of the separator, the separating chamber being of generally tapered form, tapering from a larger diameter end to a smaller diameter end, and being in the form of an axially extending surface of revolution, the separating chamber having an overflow outlet for the less dense component, located at the larger diameter end, and an underflow outlet at the smaller diameter end, for outflow of the greater density component, and inlet means for inlet of the mixture into the separating chamber at a location at least towards said larger diameter end with a tangential component of motion, characterized in that the inlet means is in the form of an axially extending inlet duct which opens into the separating chamber at said larger diameter end thereof, the inlet duct being provided with flow directing means for axially directing flow into the separating chamber with said tangential component of motion, said inlet means further including a cylindrical portion forming an outer boundary surface within said inlet duct and within which cylindrical portion is coaxially arranged a frusto-conically shaped tapered portion for providing an inner boundary surface within said duct, said tapered portion having its larger diameter end at the end of the inlet duct nearest the separating chamber, said large diameter end of said tapered portion being closed except for a small diameter axial passage for providing fluid communication between the separating chamber and the overflow outlet.

4,966,704

ANAEROBIC PROCESS FOR MICROBIOLOGICAL PURIFICATION OF SULPHUR-CONTAINING WATER

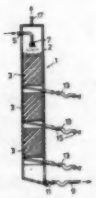
Erik Särner, Abbekås, Sweden, assignor to AC Biotechnics AB, Sweden

Continuation of Ser. No. 99,494, Sep. 17, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 332,432

Claims priority, application Sweden, Sep. 24, 1986, 8604043

Int. Cl.[5] C02F *3/30*

U.S. Cl. 210—603 **11 Claims**



1. A two-step process for microbiological purification of contaminated sulphur-containing water, comprising

depoisoning for removal of sulphur compounds from the water by supplying water at the upper end of a reactor having a stationary bed and a biofilm fixed thereon using anaerobic conditions and bringing the water to trickle over the fixed biofilm without drenching the bed and while maintaining a continuous gas phase within the bed; and

microbiologically purifying the water that has trickled through said stationary bed.

4,966,705

WASTE WATER TREATMENT PLANT AND PROCESS

Donald F. Jamieson, Clontarf, Australia, and Paul J. Cardinal, San Francisco, Calif., assignors to Austgen Biojet Holdings Pty. Ltd.

Continuation of Ser. No. 68,747, Mar. 30, 1987, abandoned, which is a continuation of Ser. No. 767,756, Aug. 21, 1985, abandoned. This application Mar. 21, 1989, Ser. No. 326,278

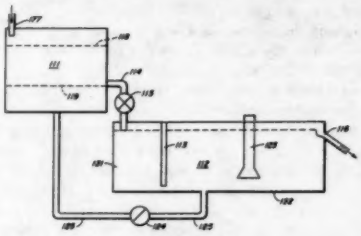
Claims priority, application Australia, Aug. 24, 1984, PG6750; Aug. 24, 1984, PG6751

Int. Cl.[5] C02F *3/30*

U.S. Cl. 210—605 **21 Claims**

1. A waste water treatment plant comprising a reaction tank and an aeration tank, the reaction tank having a bottom

surface and being subdivided by at least one baffle into a pre-react zone and a react zone, the zones being in communication through at least one aperture adjacent said bottom surface of said reaction tank, inlet means for admitting waste water for treatment into the pre-react zone of the reaction tank, first transfer means for intermittently transferring waste water from the react zone of the reaction tank to the aeration tank to displace treated water therefrom through stationary outlet means, the first transfer means discharging proximate the bottom of the aeration tank, aeration means to aerate the react



zone of the reaction tank and the aeration tank but not the pre-react zone of the reaction tank when the first transfer means is inoperative [for operating said pre-react zone anoxically], second transfer means for transferring sludge and waste water from the aeration tank to the pre-react zone of the reaction tank after the first transfer means has ceased operation and before the aeration means is actuated, and control means to stop the aeration means in sufficient time before actuation of the first transfer means to allow substantial settling of the sludge in the aeration tank.

4,966,706

PROCESS FOR TREATMENT OF CLARIFICATION SLUDGE

Carl H. Gregor, Grünwald, Fed. Rep. of Germany, assignor to Peroxid-Chemie GmbH, Hoellriegelskreuth, Fed. Rep. of Germany

Continuation of Ser. No. 225,265, Jul. 28, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,673

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3726020; May 18, 1988, 3816989

Int. Cl.[5] C02F *3/28*

U.S. Cl. 210—609 **11 Claims**

1. A process for the treatment of clarification sludge, comprising: pretreating a raw sludge which contains pathogenic germs, parasites and germs for putrefaction with a per acid containing up to 3 carbon atoms in a concentration of 500 to 6000 mg of per acid per liter of sludge to form a pretreated sludge wherein the pathogenic germs and parasites are destroyed and the germs for digesting are not destroyed; and digesting the pretreated sludge.

4,966,707

LIQUID/LIQUID EXTRACTIONS WITH MICROPOROUS MEMBRANES

Edward L. Cussler, Edina, Minn.; Robert W. Callahan, and Paul R. Alexander, Jr., both of Charlotte, N.C., assignors to Celanese Corporation, New York, N.Y.

Filed May 13, 1986, Ser. No. 862,807

Int. Cl.[5] B01D *61/28*

U.S. Cl. 210—632 **13 Claims**

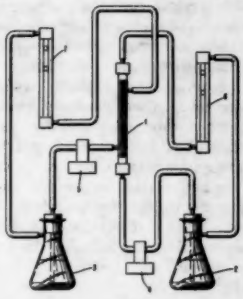
1. A process for extracting a solute from a feed liquid into an extractant liquid wherein said liquids are immiscible, comprising the steps of:

(a) determining in which one of said feed and extractant liquid the solute is more soluble;

(b) selecting a microporous membrane having opposing membrane surfaces;

(c) wetting said microporous membrane by allowing said feed liquid or said extract liquid determined in step (a) as the one liquid in which said solute is more soluble to be brought into contact with one of said membrane surfaces so as to fill completely the pores of said membrane and to thereby produce a wetted microporous membrane whose filled pores consist solely of said one liquid;

(d) immobilizing said one liquid at the other said membrane surface;



(e) bringing the other of said feed and extractant liquids not filling the pores of the membrane and in which said solute is less soluble into contact with said one liquid at said other membrane surface to thereby establish an interfacial contact between said one and other liquids; and thereafter

(f) extracting said solute between said one and other liquids at said established interface.

4,966,708

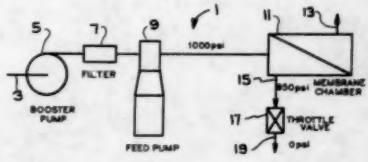
POWER RECOVERY PUMP TURBINE

Robert A. Oklejas, 774 E. Hurd Rd., and Eli Oklejas, Jr., 1648 W. Lorain, Apt. 202, both of Monroe, Mich. 48161

Continuation of Ser. No. 315,139, Feb. 24, 1989, abandoned. This application Nov. 30, 1989, Ser. No. 443,736

Int. Cl.[5] B01D *61/12*

U.S. Cl. 210—637 **8 Claims**



1. A method for controlling a reverse osmosis water purification system comprising:

supplying high pressure water to be purified to the pump side of a power recovery pump turbine, said power recovery pump turbine having a turbine side and a pump side with an impeller positioned in said pump and turbine sides of said power recovery pump turbine, said impellers being mounted on a common shaft;

directing said water from said pump side of said power recovery pump turbine to a membrane chamber where a portion of said water is purified and the remainder of said unpurified water is discharged from said membrane chamber at a high pressure;

causing said pressure in said membrane chamber to increase sufficient to increase production of purified water substantially to the desired level supplying said high pressure unpurified water from said membrane chamber to said turbine end of said power recovery pump turbine, said high pressure water causing said impeller in said turbine side to rotate which causes said impeller in said pump end to rotate to boost said pressure of said water supplied to said membrane chamber, said power recovery pump tur-

bine acting to maintain said purified water production in said membrane chamber at a substantially desired level, if said purified water production in said membrane chamber increases a larger percentage of said water passes through said membrane in said membrane chamber and there is a decrease in the high pressure unpurified water discharged from said membrane chamber to said turbine side of said power recovery pump turbine which decreases said rotation rate of said turbine impeller and said pump impeller which decreases said pressure boost supplied to said water supplied to said membrane chamber sufficient that said pressure in said membrane chamber is caused to decrease which reduces production of purified water substantially to the desired level, if said purified water production in said membrane chamber decreases there is a decrease in the percentage of said water that is purified by passing through said membrane in said membrane chamber and an increase in the high pressure unpurified water discharged from said membrane chamber to said turbine end of said power recovery pump turbine, the increase in the high pressure unpurified water increases the rotation rate of said turbine impeller and said pump impeller which increases said pressure boost supplied to said water supplied to said membrane chamber whereby.

4,966,709

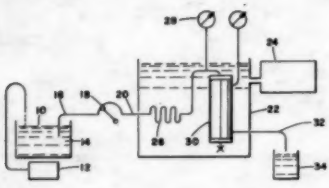
THERMOFILTRATION OF PLASMA

Yukihiko Nosé, Cleveland Heights; Paul S. Malchesky, Painsville Township, Lake County, and Takashi Horiuchi, South Euclid, all of Ohio, assignors to The Cleveland Clinic Foundation, Cleveland, Ohio

Continuation of Ser. No. 810,926, Dec. 19, 1985, abandoned. This application Jul. 18, 1988, Ser. No. 220,919

Int. Cl.[5] B01D *37/00, 61/14*

U.S. Cl. 210—651 **30 Claims**



1. A method for selectively removing the low-density lipoproteins from a plasma solution while maintaining the level of the high-density lipoproteins in the solution, comprising the steps of:

(a) providing a plasma solution containing low-density lipoproteins and high-density lipoproteins;

(b) heating said plasma solution to a temperature at or above 37° C. but below the boiling point of the plasma solution; and,

(c) thermofiltering the heated plasma solution with a membrane filter to selectively remove the low-density lipoproteins from the plasma solution while maintaining the level of the high-density lipoproteins in the solution by the differences in sieving coefficients of said low-density and high-density lipoproteins at the heated temperature.

4,966,710

METHOD FOR REMOVING MAGNESIUM AND CALCIUM FROM SODIUM SULFATE SOLUTIONS

Tai K. Kim, Towanda, and Robert P. McClintic, Monroeton, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Apr. 4, 1990, Ser. No. 504,476

Int. Cl.[5] B01D *15/04*

U.S. Cl. 210—665 **2 Claims**

1. A method for removing magnesium and calcium from sodium sulfate solutions, to render said solutions suitable for membrane processing, said method comprising:

(a) adjusting the pH of said solutions to about 11 to about 13 with sodium hydroxide to form a precipitate containing the bulk of said magnesium and said calcium;

(b) removing said precipitate from the resulting partially purified sodium sulfate solution; and

(c) contacting said partially purified sodium sulfate solution with a polystyrene divinyl benzene copolymer chelating cation exchange resin having an aminophosphonic functional group and having sodium as the exchangeable cation, to remove essentially all of said magnesium and said calcium from said partially purified sodium sulfate solution.

4,966,711

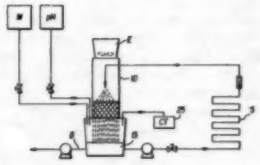
TRANSITION METALS AS TREATMENT CHEMICAL TRACERS

John E. Hoots, St. Charles; Rodney H. Banks, Naperville, and Donald A. Johnson, Batavia, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 27, 1989, Ser. No. 315,713

Int. Cl.[5] C02F *1/00*

U.S. Cl. 210—697 **28 Claims**



1. A method for monitoring the composition of a liquid system which comprises adding a quantity of a transition metal compound to said liquid system and detecting the amount of said transition metal compound within one or more samples of said liquid system, wherein the quantity of transition metal compound detected within the samples corresponds to the concentration of one or more treating agents of said liquid system, wherein the transition metal compound is in the form of ions, cations, oxyanions or other charged radicals which are soluble in said liquid system, and wherein said transition metal compound contains a transition metals selected from the group consisting of yttrium, zinc, vanadium, manganese, nickel, cobalt, molybdenum, and chromium (III).

4,966,712

FLOTATION COLLECTOR AND METHOD FOR TREATMENT OF INORGANIC SUBSTANCE-CONTAINING WATER SYSTEM BY USE THEREOF

Hideyuki Nishibayashi, Ibaraki; Yoshiaki Urano, Kawasaki; Nobuhiro Matsuura; Yoshiyuki Hozumi, both of Yokohama, and Fumio Watanabe, Kawasaki, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

PCT No. PCT/JP88/00475, § 371 Date Jan. 19, 1989, § 102(e) Date Jan. 19, 1989, PCT Pub. No. WO88/09215, PCT Pub. Date Dec. 1, 1988

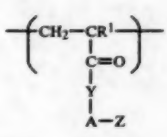
PCT Filed May 19, 1988, Ser. No. 304,841

Claims priority, application Japan, May 22, 1987, 62-123682

Int. Cl.[5] B03D *1/016, 1/02;* C02F *1/24, 1/56*

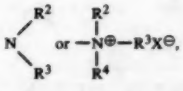
U.S. Cl. 210—705 10 Claims

1. A method for the treatment of an inorganic substance-containing water system, which method comprises adding to said inorganic substance-containing water system a copolymer having an average molecular weight in the range of 1,000 to 1,000,000 and comprising (A) 2 to 95 mol % of a structural unit represented by the general formula I:

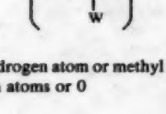


(I)

wherein R^1 is hydrogen atom or methyl group, Y is —O—, A is an alkylene group of 1 to 4 carbon atoms, and Z is

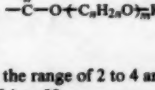


wherein R^2, R^3 and R^4 are independently hydrogen atom, alkyl group of 1 to 12 carbon atoms, or aralkyl group of 7 to 10 carbon atoms, and $X^{\ominus}$ is anion pair, (B) 5 to 98 mol % of a structural unit represented by the general formula II:



(II)

wherein R^5 is hydrogen atom or methyl group, W is aryl group of 6 to 8 carbon atoms or 0



wherein

n is an integer in the range of 2 to 4 and m is 0 or an integer in the range of 1 to 20,

and R^6 is alkyl group of 1 to 18 carbon atoms, cycloalkyl group of 5 to 8 carbon atoms, aralkyl group of 7 to 10 carbon atoms, or aryl group of 6 to 18 carbon atoms, and (C) 0 to 50 mol % of other structural unit, providing that the total amount of said structural units (A), (B), and (C) is 100 mol %, in a proportion in the range of 1 to 20,000 mg of said copolymer/liter of said inorganic substance-containing water system and subjecting the water system containing the copolymer to flotation to separate the inorganic substances from said water system.

4,966,713

PROCESS FOR THE TREATMENT OF WASTE WATER FROM FOOD PROCESSING PLANTS

Daniel W. Keys, and Grady W. Burgin, both of Gastonia, N.C., assignors to FMC Corporation

Filed Apr. 13, 1989, Ser. No. 337,630

Int. Cl.[5] C02F *1/54*

U.S. Cl. 210—705 31 Claims

1. A process for the treatment of solid waste containing effluent water from a food processing plant, comprising contacting the effluent water with a flocculant comprising a crude algal composition obtained from algae selected from the classes Rhodophyceae, Cyanophyceae, Chlorophyceae, Phaeophyceae, and mixtures of two or more thereof, at an acidic pH, whereby a floc is formed containing substantially all of the solid waste components of the effluent water.

4,966,714

PROCESS FOR TREATING WASTE WATER

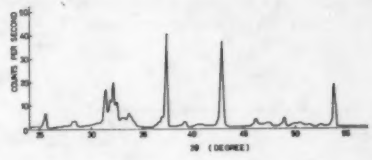
Kouzou Hirosawa, and Yukio Kanazawa, both of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Oct. 18, 1989, Ser. No. 423,339

Claims priority, application Japan, Oct. 21, 1988, 63-263900

Int. Cl.[5] C02F *1/52*

U.S. Cl. 210—708 14 Claims



1. A process for treating waste water containing one or more latexes or emulsions of synthetic resin particles in order to remove the synthetic resin particles, which comprises the steps of: adding to and mixing in said waste water a CaO-MgO-SiO_2 treatment agent which has been prepared by heating, at a temperature in the range of from 700° C. to 1000°C., a mixture of (1) dolomite which is thermally decomposed to form CaO and MgO at said temperature and (2) SiO_2-containing substance, mixed in proportions such that the weight ratio of CaO/MgO in said treatment agent is greater than 1, the weight ratio of MgO/SiO_2 in said treatment agent is greater than 1, and the sum of CaO, MgO and SiO_2 in said treatment agent is greater than 80 weight %, whereby to cause coagulation and sedimentation of seid synthetic resin particles to form flocs, and then separating said flocs from the remainder of the treated waste water.

4,966,715

PROCESS FOR THE REMOVAL OF CYANIDE FROM WASTEWATERS

M. Quamrul Ahsan, Waldwick; Andrew Griffiths, Ridgewood; Ernest Haug, Ramsey, all of N.J., and Roy Norcross, Norwalk, Conn., assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 19, 1989, Ser. No. 354,039

Int. Cl.[5] C02F *1/52, 1/72*

U.S. Cl. 210—721 12 Claims

1. A method of treating industrial wastewater containing cyanide for the conversion of cyanide toxic substances into non-toxic materials comprising adding to wastewater an oxidizing agent consisting essentially of a source of hydrogen peroxide and phosphoric acid with a molar ratio of phosphoric acid to hydrogen peroxide between 1:60 and 1:3 in a sufficient amount to oxidize said cyanide in the wastewater.

4,966,716

METHOD FOR THE CONTROL OF BIOFOULING IN RECIRCULATING WATER SYSTEMS

Nicolai A. Favstritsky, Lafayette; Arthur J. Hein, and Glade E. Squires, both of West Lafayette, all of Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

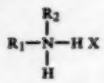
Division of Ser. No. 211,227, Jun. 24, 1988, Pat. No. 4,935,153. This application Mar. 13, 1990, Ser. No. 492,726

Int. Cl.[5] C02F *1/50*

U.S. Cl. 210—755 3 Claims

1. A method for controlling biofouling in an aqueous system comprising the steps of:

introducing a water solution comprising (i) an organic ammonium hydrohalide of the formula:



where R_1 and R_2 are independently hydrogen, hydroxyethyl, alkyl, cyclic alkyl, (alpha, omega)-alkyl, alkyl ether, polyether, heterocyclic ring-substituted alkyl, and halogenated alkyl; X is chlorine, bromine or iodine; and only one of R_1 and R_2 may be hydrogen; and (ii) bromine, wherein the molar ratio of ammonium hydrohalide to bromine lies in the range of about 1 to 4:1, into the system at a frequency, duration and concentration sufficient to control biofouling in the system.

4,966,717

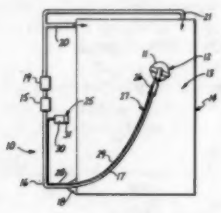
OZONE INJECTION SYSTEM AND METHOD

Donald W. Kern, 5290 Orcutt Rd., San Luis Obispo, Calif. 93401

Filed Feb. 10, 1989, Ser. No. 309,413

Int. Cl.[5] C02F *1/78*

U.S. Cl. 210—760 15 Claims



1. A method of injecting ozone into the water of a swimming pool, comprising:

providing a source of pressurized ozone, a swimming pool vacuum cleaner head, a dispersion member carried by the vacuum cleaner head, and a flexible conduit connecting the source of pressurized ozone to the dispersion member;

conducting ozone through the flexible conduit from the source of pressurized ozone to the dispersion member;

discharging ozone from the dispersion member into the water of a swimming pool; and

moving the vacuum cleaner head about within the water of the swimming pool while the dispersion member discharges ozone received through the flexible conduit from the source of pressurized ozone for sanitizing purposes.

4,966,718

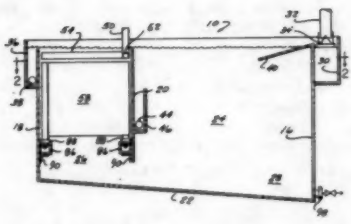
CROSS FLOW FILTER METHOD

Willard L. Johnson, 12923 W. Lincoln Ave., Huntington Woods, Mich. 48070

Continuation-in-part of Ser. No. 205,456, Jun. 10, 1988, which is a continuation-in-part of Ser. No. 120,581, Nov. 19, 1987, Pat. No. 4,859,332, which is a continuation-in-part of Ser. No. 24,383, Mar. 19, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,647

Int. Cl.[5] B01D *45/04*

U.S. Cl. 210—776 20 Claims



1. A filtration method for a liquid comprising the steps of:

filtering a liquid through a filter assembly disposed in a filter retaining section of a tank, said filter assembly including a filter panel having a generally planar vertically disposed filter media surface with pores;

applying vacuum pressure in communication with the filter panel to draw liquid filtrate through the pores of the filter media surface at a flow rate Q_{out};

drawing liquid from a liquid retaining section of the tank in fluid communication with the filter retaining section of the tank;

cross flowing the liquid drawn from the liquid retaining section of the tank vertically downward across the filter media surface, such that the horizontal velocity V_h of the liquid is less than the vertical velocity V_v of the liquid, the liquid cross flowing at a flow rate of Q_x while filtering, wherein Q_x is greater than Q_{out};

recirculating liquid from below the filter assembly in the filter retaining section of the tank to the liquid retaining section of the tank;

settling particles from the liquid in the liquid retaining section of the tank by gravitational forces;

accumulating the settled particles in a solids collection section of the tank in fluid communication with the liquid retaining section of the tank;

drawing filtrate from a first manifold inlet in fluid communication with a first filter panel under vacuum pressure from a suction inlet of a pump, while applying positive pressure through a pressurized inlet to a second separate and independent manifold inlet in fluid communication with a second filter panel for a period of time;

closing the pressurized inlet while communicating the suction inlet of the pump simultaneously with both the first and second manifold inlets for a period of time; and

applying positive pressure to the first manifold inlet while the suction inlet of the pump draws filtrate from the second manifold inlet for a period of time.

4,966,719

MULTIFUNCTIONAL MOLYBDENUM AND SULFUR CONTAINING LUBE ADDITIVES

Catherine L. Coyle, Mendham, N.J.; Mark A. Greaney, Upper Black Eddy, Pa.; Edward I. Stiefel, Bridgewater, and Morton Beltzer, Westfield, both of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Mar. 12, 1990, Ser. No. 493,042
Int. Cl.[5] C10M *139/00*
U.S. Cl. 252—42.7 11 Claims

1. A lubricating composition comprising: a major amount of an oil of lubricating viscosity; and, a minor amount of an additive having the formula MoL_4 wherein L is a ligand selected from thioxanthates and mixtures thereof.

4,966,720

OIL SOLUBLE SULFURIZED OLEFINS AND TWO TEMPERATURE ZONE PROCESS FOR THEIR PREPARATION

David J. DeGonia, Granite City, and Paul G. Griffin, Collingsville, both of Ill., assignors to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Continuation of Ser. No. 304,762, Jan. 31, 1989, abandoned. This application Apr. 30, 1990, Ser. No. 517,486
Int. Cl.[5] C10M *135/04, 135/22*
U.S. Cl. 252—45 11 Claims

1. A process for making a sulfurized olefin having improved solubility in lubricating oil comprising:

A. reacting sulfur monochloride with an aliphatic monoolefin containing 3 to 6 carbon atoms to form an adduct by pre-cooling sulfur monochloride to a temperature below about 10° C. and adding said monoolefin to the sulfur monochloride with cooling so as to maintain the temperature of the reaction mixture at or below about 10° C. until from about 1 to 1.5 gram moles of said monoolefin per gram mole of sulfur monochloride have been added and then adding additional monoolefin while maintaining said temperature at from about 15° to 22° C. until a total of from about 1.7 to 1.9 gram moles of said monoolefin per gram mole of sulfur monochloride have been added;

B. reacting said adduct with a basic, aqueous alcoholic solution of sodium sulfide at a temperature of from about 50° C. up to reflux to form said sulfurized olefin; and

C. recovering said sulfurized olefin.

4. A sulfurized lubricating oil additive having improved solubility made by the process comprising:

A. reacting sulfur monochloride with an aliphatic monoolefin containing 3 to 5 carbon atoms to form an adduct by pre-cooling sulfur monochloride to a temperature below about 10° C. and adding said monoolefin to the sulfur monochloride with cooling so as to maintain the temperature of the reaction mixture at or below about 10° C. until from about 1.0 to 1.5 gram moles of said monoolefin per gram mole of sulfur monochloride have been added and then adding additive monoolefin while maintaining said temperature at from about 15° to 22° C. until a total of from about 1.7 to 1.9 gram moles of said monoolefin per gram mole of sulfur monochloride have been added;

B. reacting said adduct with a basic, aqueous alcoholic solution of sodium sulfide at a temperature of from about 50° C. up to reflux to form said sulfurized olefin; and

C. recovering said sulfurized olefin.

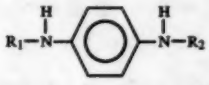
4,966,721

N-N'-DIHYDROCARBYL SUBSTITUTED PHENYLENE DIAMINE-DERIVED CONDENSATION PRODUCTS AS ANTIOXIDANTS AND LUBRICANT COMPOSITIONS

Liehpao O. Farng, Lawrenceville, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Jul. 19, 1989, Ser. No. 381,890
Int. Cl.[5] C10M *133/12*
U.S. Cl. 252—51.5 R 60 Claims

1. A composition comprising a major amount of an oil of lubricating viscosity or grease or other solid lubricant prepared therefrom and a minor multifunctional antioxidant/corrosion inhibiting amount of the product of reaction of (1) a N,N-dihydrocarbyl substituted phenylenediamine having the following generalized structure:



(2) an aldehyde or ketone having the following generalized structure:

and (3) an aliphatic amine having the following generalized structure:

where R_1, R_2, R_3, R_4, R_5, R_6 are hydrogen or C_1 to C_{60} hydrocarbyl, or oxygen, sulfur, nitrogen containing C_2 to about C_{60} hydrocarbyl or mixtures thereof.

4,966,722

OIL ADDITIVE COMPOSITIONS EXHIBITING REDUCED HAZE CONTAINING POLYMERIC VISCOSITY INDEX IMPROVER

Marvin F. Smith, Jr., Aberdeen, N.J., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Nov. 16, 1988, Ser. No. 271,695
Int. Cl.[5] C10M *161/00*
U.S. Cl. 252—56 R 64 Claims

1. A process of reducing haze in a composition comprising:

(i) lubricating oil;

(ii) at least a viscosity index improving amount of copolymer of ethylene and at least one other alpha-olefin monomer, said copolymer comprising intramolecularly heterogeneous and intermoleculary homogeneous copolymer chains containing at least one crystallizable segment of methylene units and at least one low crystallinity ethylene-alpha-olefin copolymer segment, wherein said at least one crystallizable segment comprises at least about 10 weight percent of said copolymer chain and contains at least about 57 weight percent ethylene, wherein said low crystallinity segment contains not greater than about 53 weight percent ethylene, and wherein said copolymer has a molecular weight distribution characterized by at least one of a ratio of $\overline{M}_w/\overline{M}_n$ of less than 2 and a ratio of $\overline{M}_z/\overline{M}_w$ less than 1.8, and wherein at least two portions of an individual intramolecularly heterogeneous chain, each portion comprising at least 5 weight percent of said chain, differ in composition from one another by at least 7 weight percent ethylene;

(iii) a haze forming amount of an oil insoluble haze forming

material resulting from the manufacture or finishing processes of said ethylene-alpha-olefin copolymer;

(ii) which process comprises adding to said composition a haze-reducing effective amount of at least one hydrocarbyl substituted succinic acid.

4,966,723

BLEACH ACTIVATORS IN DETERGENT COMPOSITIONS

Stephen R. Hodge, Kirkella, and Andrew Pearce, Brough, both of England, assignors to BP Chemicals Limited, London, England

PCT No. PCT/GB89/00130, § 371 Date Sep. 14, 1989, § 102(e) Date Sep. 14, 1989, PCT Pub. No. WO89/07639, PCT Pub. Date Aug. 24, 1989

PCT Filed Feb. 9, 1989, Ser. No. 401,443

Claims priority, application United Kingdom, Feb. 11, 1988, 8803114

Int. Cl.[5] C11D *3/28, 3/39*

U.S. Cl. 252—102 **21 Claims**

1. A detergent composition in aqueous solution comprising

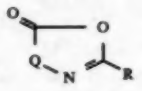
(i) a surfactant selected from anionic, nonionic, zwitterionic and cationic surfactants and mixtures thereof,

(ii) a precursor compound capable of giving rise to a peroxygen compound in the presence of water,

(iii) a bleach activator capable of enhancing the bleaching activity of the peroxygen compound so formed,

(iv) a suds suppressing agent and

(v) a detergent builder, characterised in that the bleach activator comprises one or more cyclic tertiary nitrogen compounds of the generic formula



(I)

wherein Q is an organic divalent grouping such that Q and N together with the carbonyl and oxygen functions in the compound form one or more cyclic structures and R is H an alkyl, alkaryl, aryl, aralkyl, alkoxyl, haloalkyl, amino alkyl, amino, carboxylic or a carbonyl-containing groups, said activator being at least partially soluble in water.

4,966,724

VISCOUS HARD-SURFACE CLEANING COMPOSITIONS CONTAINING A BINARY GLYCOL ETHER SOLVENT SYSTEM

Stephen Culshaw, Le Pecq, France, and Eddy Vos, Linden, Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 27, 1989, Ser. No. 303,411

Claims priority, application United Kingdom, Jan. 30, 1988, 8802106

Int. Cl.[5] C11D *3/44, 3/20*

U.S. Cl. 252—158 **8 Claims**

1. A vicous liquid hard-surface cleaning composition having a viscosity of more than about 30 cps containing:

A. from 3% to 10% of surface-active agent;

B. from 3% to 10% of a binary solvent mixture consisting of:

(1) Butyl Carbitol and

(2) n-butoxy propoxy propanol, the weight ratio of (1) to (2) being from 3/1 to ⅓;

C. from 1% to 10% of builder;

D. from 0.5% to 8% of buffer, the weight ratio of C to D being from ½ to 3/1;

E. less than 1.5% of hydrotrope; and

F. the balance water.

4,966,725

AQUEOUS DISPERSIONS FOR SIMULTANEOUSLY PROVIDING FIBROUS MATERIALS WITH A SOFTENING AND HYDROPHILIC FINISH, A PROCESS FOR THEIR PRODUCTION AND THEIR USE

Heinrich Singer, Horgau; Werner Stechele, Diedorf, and Michael Bernhein, Aystetten, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

PCT No. PCT/EP87/00391, § 371 Date Jan. 19, 1989, § 102(e) Date Jan. 19, 1989, PCT Pub. No. WO88/00991, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 18, 1987, Ser. No. 302,691

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1986, 3626051

Int. Cl.[5] D06M *13/46, 15/26;* C08F *2/18;* C08L *33/08*

U.S. Cl. 252—8.8 **15 Claims**

1. An aqueous polyalkylacrylate dispersion for simultaneously providing fibrous material with a softening and hydrophilic finish, comprising

(1) a quaternary imidazolinium or ammonium emulsifier which is substituted with at least one alkyl or alkenyl group having at least 12 carbon atoms;

(2) an alkylacrylate polymer or copolymer in which alkylacrylate the alkyl group has at least 4 carbon atoms;

(3) optionally one or more additional emulsifiers; and

(4) optionally a silicone hydrophilic finishing agent;

wherein the polymer or copolymer (2) has been polymerized in the presence of emulsifier (1).

4,966,726

CHIRAL REACTION PRODUCTS PRODUCED FROM MESOGENIC MOLECULAR STRUCTURAL ELEMENTS AND BIFUNCTIONALLY REACTIVE TARTARIC ACID DERIVATIVES, AND THEIR USE AS DOPANTS IN LIQUID CRYSTAL PHASES

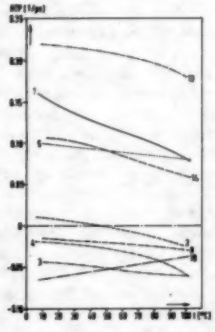
Günter Scherowsky, and Manel Gunaratne, both of Berlin, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 14,290, Feb. 13, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 222,340

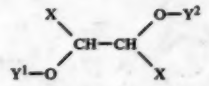
Claims priority, application Fed. Rep. of Germany, Feb. 17, 1986, 3604898

Int. Cl.[5] C09K *19/10, 19/30;* C07D *317/26;* G02F *1/13*

U.S. Cl. 252—299.6 **3 Claims**



1. A compound containing a molecular structural element with two chirality centers and at least one mesogenic molecular structural element, which compound is defined by the formula (I)



(I)

wherein:

Y^1 is H, (C_1–C_{10})alkyl, MC—CH_2 or MC—CO, MC being a mesogenic radical of the formula (II)

$$R^4–(A^1–)_{n1}(B–)_{n2}(A^2–)_{n3} \quad \text{(II)}$$

wherein:

R^4 is a straight-chain or branched (C_1–C_{12})alkyl group, in which one CH_2 group of the alkyl group can be replaced by an O atom, or if n1 is 1, R^4 also can be F, Cl, Br or CN,

A^1, A^2 are, independently of each other, 1,4-phenylene or 1,4-cyclohexylene,

B is CO—O or O—CO,

n1, n2, n3 are, independently of each other, 0, 1 or 2, n1 and n3 not being 0 at the same time, and n1 and n3 not being 2 at the same time,

Y^2 is (C_1–C_{10})alkyl, MC—CH_2 or MC—CO, or Y^1 and Y^2 together represent the group MC—CH, which is then part of a dioxolane ring,

X is $COOR^1$, $CONH^2$, $CONR^2R^3$ or C≡N,

R^1 is (C_1–C_{10})alkyl or MC—CH2 and

one of R^2 and R^3 is H and the other is (C_1–C_4)alkyl or, independently of each other, both R^2 and R^3 are (C_1–C_4)alkyl.

2. A twistable liquid crystal phase containing 0.01 to 70% by weight of at least one of the chiral compounds of the formula (I) as claimed in claim 1.

4,966,727

FERROELECTRIC LIQUID CRYSTAL MIXTURE FOR GUEST-HOST TYPE DISPLAY ELEMENTS

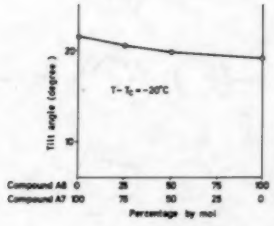
Mitsuyoshi Ichihashi; Kanetsugu Terashima; Makoto Kikuchi, all of Yokohamashi; Fusayuki Takeshita, Kawasakishi, and Kenji Furukawa, Yokosukashi, all of Japan, assignors to Chisso Corporation, Japan

Filed Nov. 24, 1987, Ser. No. 124,559

Claims priority, application Japan, Nov. 28, 1986, 61-283257

Int. Cl.[5] C09K *19/34, 19/52*

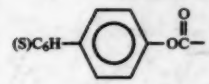
U.S. Cl. 252—299.61 **9 Claims**

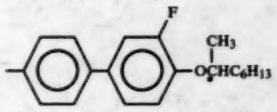


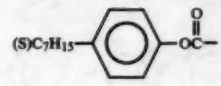
1. A ferroelectric smectic C liquid crystal mixture having a smectic A phase region within 30° C. on the higher temperature side relative to a chiral smectic C phase and also having a tilt angle at its chiral smectic C phase in the range of 30° to 60°, which mixture is selected from the group consisting of the following mixtures 1 to 7:

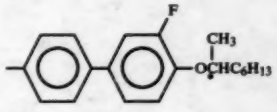
Mixture 1

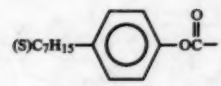
-continued

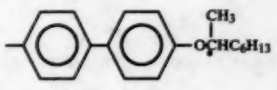
10 wt. % 

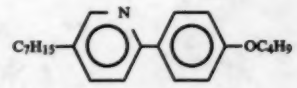


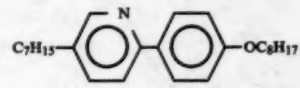
5 wt. % 

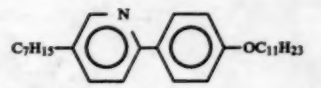


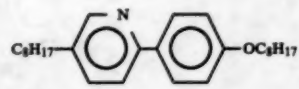
5 wt. % 

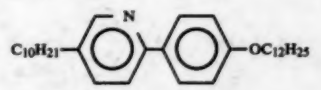


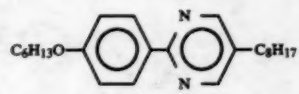
5 wt. % 

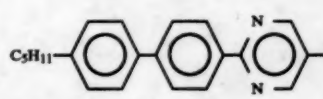
5 wt. % 

5 wt. % 

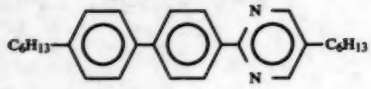
5 wt. % 

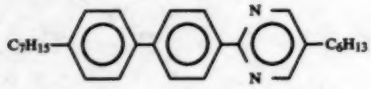
5 wt. % 

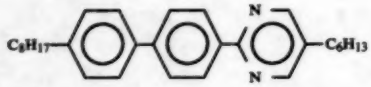
5 wt. % 

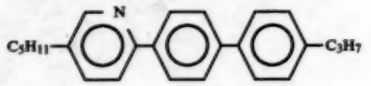
5 wt. % 

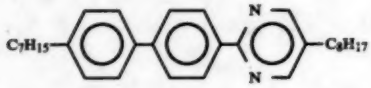
-continued

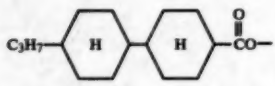
5 wt. % 

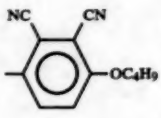
5 wt. % 

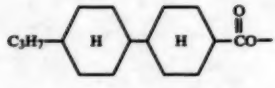
5 wt. % 

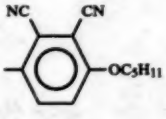
5 wt. % 

5 wt. % 

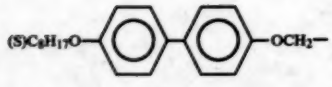
5 wt. % 

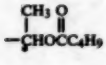


5 wt. % 

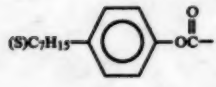


and

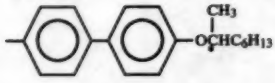
10 wt. % 

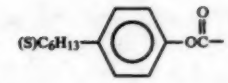


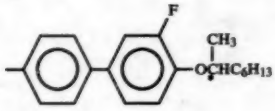
Mixture 2

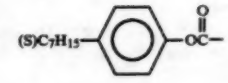
5 wt. % 

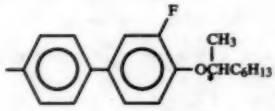
-continued

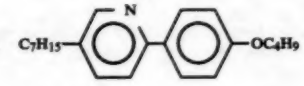


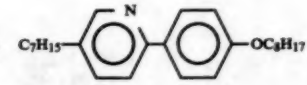
10 wt. % 

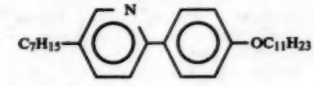


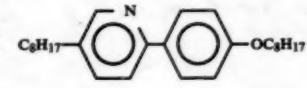
5 wt. % 

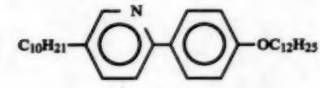


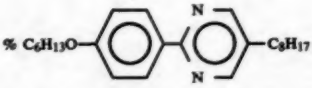
5.5 wt. % 

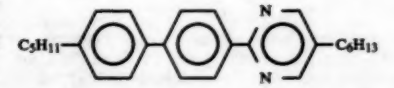
5.5 wt. % 

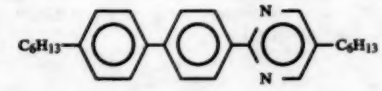
5.5 wt. % 

5.5 wt. % 

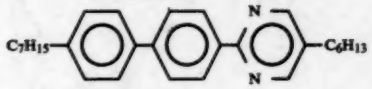
5.5 wt. % 

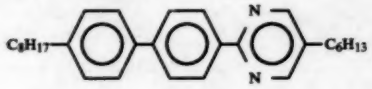
10.75 wt. % 

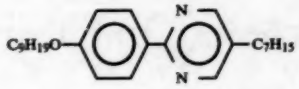
8.5 wt. % 

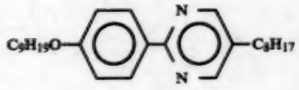
5.5 wt. % 

-continued

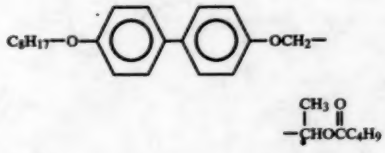
7.75 wt. % 

5.5 wt. % 

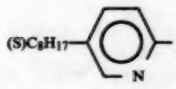
1.5 wt. % 

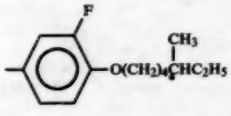
3 wt. % 

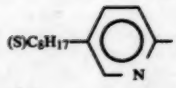
and

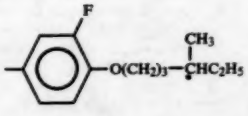
10 wt. % 

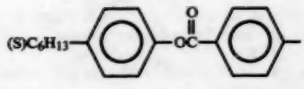
Mixture 3

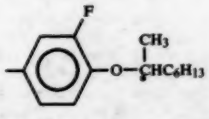
5 wt. % 



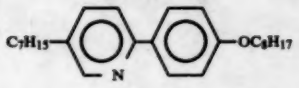
10 wt. % 

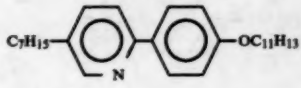


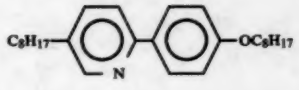
25 wt. % 

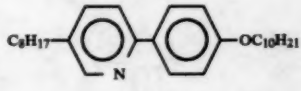


-continued

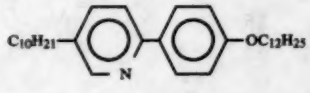
10 wt. % 

10 wt. % 

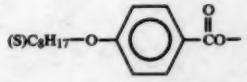
20 wt. % 

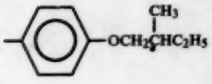
10 wt. % 

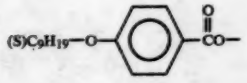
and

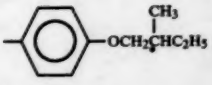
10 wt. % 

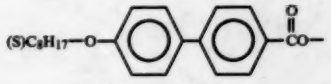
Mixture 4

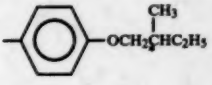
20 wt. % 

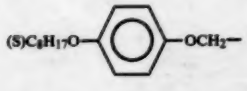


20 wt. % 

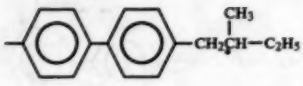


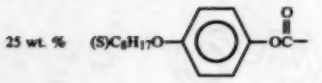
10 wt. % 



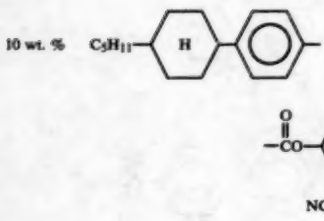
15 wt. % 

-continued

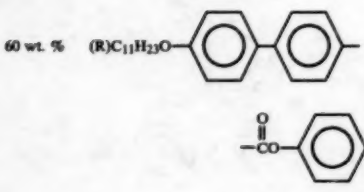




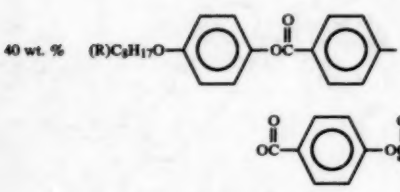
and



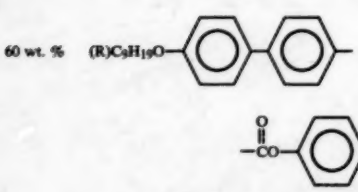
Mixture 5



and

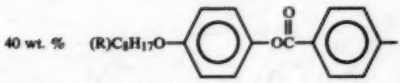


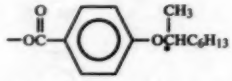
Mixture 6



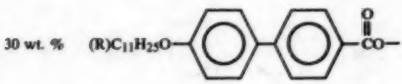
and

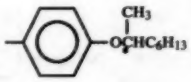
-continued



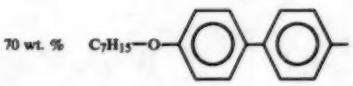


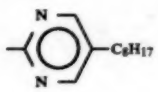
Mixture 7





and





4,966,728

ADJUVANTS FOR USE WITH POSTEMERGENT HERBICIDES

James L. Hazen, Apex, N.C., assignor to BASF Corporation, Wyandotte, Mich.

Filed Aug. 26, 1988, Ser. No. 237,609

Int. Cl.[5] B01J *17/34, 17/44*

U.S. Cl. 252—354 **10 Claims**

1. A postemergent herbicide adjuvant suitable for use in tank mixes, comprising, in percent by weight,

(a) from about 20 to about 90 percent of a low foaming nonionic surfactant selected from the group consisting of

(i) alkylpolyoxyethylene polyethers wherein the alkyl group contains from 6 to about 22 carbon atoms and the polyoxyethylene moiety is derived from 3 to about 6 moles of ethylene oxide; and

(ii) alkylpolyoxyalkylene polyethers wherein the alkyl group contains from 6 to about 22 carbon atoms and the polyoxyalkylene moiety is derived from ethylene oxide and a higher alkylene oxide, and wherein the polyether has an HLB of less than about 12; and

(iii) mixtures thereof

(b) from 4 to about 40 percent of an anionic surfactant selected from the group consisting of

(i) the partial sulfate and phosphate esters and carboxylates of monohydroxyl-functional polyoxyalkylene ethers; and

(ii) the partial phosphate esters of dihydroxyfunctional polyoxyalkylene ethers; and

(c) 0 up to about 20 percent of a third component selected from the group consisting of

(i) the lower alkanol esters of 6 to 22 carbon carboxylic acids;

(ii) when component (a) is not present, the alkylpolyoxyethylene polyethers wherein the alkyl group contains

6 to about 22 carbon atoms and the polyoxyethylene moiety is derived from 3 to about 8 moles of ethylene oxide.

4,966,729

MATERIAL HAVING A RESISTIVITY WITH A POSITIVE TEMPERATURE COEFFICIENT

Francois Carmona, Gradignan; Jacques Maire; Hélène Septier, both of Paris; Roland Canet, Lormont, and Pierre Delhaes, Gradignan, all of France, assignors to Le Carbone-Lorraine, Paris, France

Filed Apr. 4, 1988, Ser. No. 177,415
Claims priority, application France, Apr. 15, 1987, 87 05781
Int. Cl.[5] H01B *1/06*
U.S. Cl. 252—511 6 Claims

1. Electrically conductive, polymer based material with electrical resistivity having a positive temperature coefficient, comprising:

(a) a matrix of a thermosetting polymer selected from the group consisting of epoxy resins, polyimides, unsaturated polyesters, silicones, polyurethanes and phenolic resins; and

said material having electrically resistivity which is substantially constant from about 20° C. up to a defined temperature, and which increases rapidly above the defined temperature.

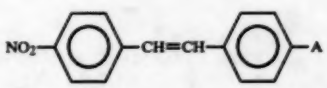
4,966,730

NONLINEAR OPTICAL DEVICES FROM DERIVATIVES OF STILBENE AND DIPHENYLACETYLENE

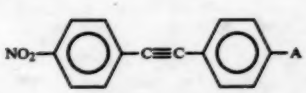
Robert A. Clement; Wilson Tam, and Ying Wang, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 155,023, Feb. 11, 1988, Pat. No. 4,909,964. This application Dec. 20, 1989, Ser. No. 453,830
Int. Cl.[5] F21V *9/04*
U.S. Cl. 252—589 1 Claim

1. In an electro-optic modulator comprising means to direct a coherent beam of radiation into an optical element and means to apply an electric field to said optical element in a direction to modify the transmission of said beam, the improvement wherein said beam is directed into an optical element comprising a crystalline compound selected from the group consisting of



and



wherein A is selected from Br, Cl, F, I, HCO, and OR, where R is a C_1–C_{10} branched or unbranched hydroxyalkyl; said compound being crystallized in a noncentrosymmetric space group.

4,966,731

PROCESS FOR PREPARING SULFONYL ACIDS

Yueting Chou, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 12, 1990, Ser. No. 464,262
Int. Cl.[5] C11C *1/00*; C07C *315/00*
U.S. Cl. 260—400 12 Claims

1. A process for the preparation of sulfonylacids represented by the formula:

wherein R is selected from the group consisting of alkyl radicals having from 1 to 20 carbon atoms, cycloalkyl radicals having from 4 to 9 carbon atoms, aryl, and alkyaryl radicals and R_1 is an alkylene radical having from 3 to 10 carbons, which comprises performing the following steps in a single reactor:

(a) reacting an alkali metal or hydroxide with a mercaptan represented by the formula:

RSH

wherein R is as defined above, in an organic solvent for said mercaptan, whereby an alkali metal mercaptide is formed,

(b) removing any water formed by the reaction of (a) above from the reactor by azeotropic distillation with said solvent,

(c) adding to the reactor a lactone or lactam represented by the formula:

wherein R_1 is as defined above, X is selected from the group consisting of nitrogen and oxygen, reacting said lactone or lactam with the mercaptide to form a thioether, removing the organic solvent from the reactor by distillation and adding water to dissolve the reaction product,

oxidizing the thiether to form a sulfonyl containing acid by chlorine oxidation.

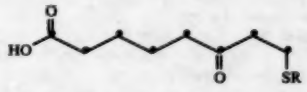
4,966,732

PROCESS FOR THE PRODUCTION OF 1,2-DITHIOLAN-3-PENTANOIC ACID (THIOCTIC ACID) AND 8-HYDROCARBYLTHIO-6-OXOOCTANOIC ACID

Gueaes Giray, Kleinostheim; Klaus Huthmacher, Geinhausen; Axel Kleemann, Mühlheim, and Thomas Lied, Obertshausen, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 848,212, Apr. 4, 1986, Pat. No. 4,705,867. This application Jul. 15, 1987, Ser. No. 73,584
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1985, 3512911
Int. Cl.[5] C07C *149/40*
U.S. Cl. 260—399 1 Claim

1. An 8-hydrocarbylthio-6-oxooctanoic acid of the formula:



in which R is phenyl.

4,966,733

RENDERING PROCESSES

Tissa Fernando, and Steven E. Dunn, both of Auckland, New Zealand, assignors to The Meat Industry Research Institute of New Zealand, Hamilton, New Zealand

Continuation-in-part of Ser. No. 788,655, Oct. 16, 1985, which is a continuation of Ser. No. 427,632, Sep. 29, 1982, which is a continuation of Ser. No. 194,537, Oct. 6, 1980. This application Apr. 29, 1986, Ser. No. 857,003

Claims priority, application New Zealand, Jun. 21, 1979, 190184

Int. Cl.[5] C11B *1/12*

U.S. Cl. 260—412.6 4 Claims

1. A low temperature continuous rendering process for separating animal or vegetable raw material which may include solids into a fat fraction and at least one protein fraction comprising:

(A) first reducing the particle size of the raw material,

(B) then feeding the reduced raw material into the lower part of a rendering vessel in the absence of process water and/or steam,

(C) feeding under pressure into the lower part of the rendering vessel recycled tallow,

(D) heating the raw material and tallow by the rendering vessel using heat exchange means, to a temperature which is in the range of 75° C. to 100° C.,

(E) continuously agitating the tallow and raw material to increase the flow rate of the tallow through the rendering vessel for causing the reduced raw material to be subjected to continuous particulate fluidization within the medium of the tallow while resident and in the rendering vessel, and

(F) moving by overflow means a flow of the heated material from the upper portion of the rendering vessel into a separator for phase separation.

4,966,734

DEODORIZATION OF FATTY ESTER MIXTURES

Ulrich Hoercher, Mannheim, and Peter Lechtken, Frankenthal, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 16, 1989, Ser. No. 324,044

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 3813805

Int. Cl.[5] C11B *7/00*

U.S. Cl. 260—420 8 Claims

1. A process for removing undesirable odors from a fatty ester mixture which, contains an ester of a highly unsaturated fatty acid, wherein the fatty ester mixture is treated with a complex hydride.

4,966,735

NON-LEAKING VENTURI CARBURETOR

Michael LoRusso, 9 Woodland Ter., Yonkers, N.Y. 10701

Filed Apr. 12, 1989, Ser. No. 336,740

Int. Cl.[5] F02M *19/08*

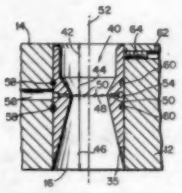
U.S. Cl. 261—40 16 Claims

1. A carburetor for mixing fuel with air to power an internal combustion engine in controllable fashion comprising:

(a) a carburetor body having at least one bore extending from its first end surface to its second end surface;

(b) a removable liner tightly fitted into each at least one bore having an interior contoured surface forming a venturi tube for laminar flow, and having an inlet section, a throat and an expansion section;

(c) said at least one liner having at its tightly fitting interface with said at least one bore, a plenum for fuel approximately at the throat of the venturi tube and at least a pair of sealing means for preventing leakage of fuel at the interface of the bore and the liner circumferentially surrounding the plenum; and



(d) a plurality of fuel ports in each of the at least one liner adapted to lead from the plenum to the inner surface of the venturi tube.

4,966,736

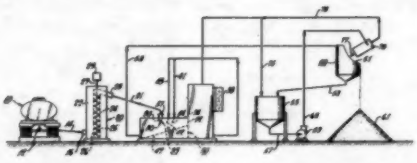
PROCESS FOR PREPARING SULFUR HAVING UNIFORM PARTICLE SIZE DISTRIBUTION

Bruce Harbolt, Northridge, and James T. Saake, Los Angeles, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Oct. 30, 1987, Ser. No. 115,608

Int. Cl.[5] B29B *9/10*

U.S. Cl. 264—11 11 Claims



1. A process for preparing particulate sulfur, having a uniform particle size, which comprises:

(a) passing a molten sulfur stream through a substantially downwardly oriented, rectangular slot to provide a coherent sheet of molten sulfur,

(b) shearing said coherent sheet of molten sulfur by contacting at least one coherent sheet of water with said coherent sheet of molten sulfur at a velocity, flow rate an angle sufficient to disrupt said coherent sheet of molten sulfur and provide solid sulfur particles having a substantially uniform size and of which a majority passes No. 8 U.S. Standard Screen and is retained on No. 20 U.S. Standard Screen, said water sheet having a width at least equal to the width of said sulfur sheet,

(c) recovering said solid sulfur particles as an aqueous slurry thereof, and

(d) separating said solid sulfur particles from said slurry by substantially removing water therefrom.

4,966,737

METHOD AND A DEVICE FOR MANUFACTURING A POWDER OF AMORPHOUS CERAMIC OR METALLIC PARTICLES

Paul Werner, Dettenheim (Ru), Fed. Rep. of Germany, and Jean-Pol Hiernaut, Linkenheim, Belgium, assignors to Europaische Atomgemeinschaft (EURATOM), Luxembourg, Luxembourg

Filed Sep. 1, 1989, Ser. No. 401,696

Claims priority, application Luxembourg, Sep. 27, 1988, 87346

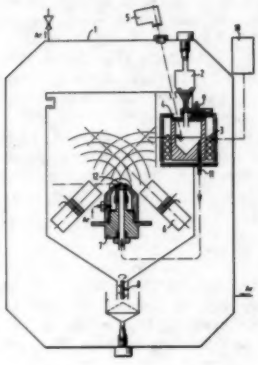
Int. Cl.[5] B29B *9/10*

U.S. Cl. 264—14 2 Claims

1. A method for manufacturing a powder of amorphous ceramic or metallic particles in a high pressure autoclave comprising the steps of: projecting said substance in the liquid state

through an orifice of a nozzle in a vertical upward direction, subjecting the area in front of the nozzle orifice to an acoustic levitation field and flowing an inert cooling gas turbulently in said area, so that droplets sprayed out of the nozzle are rapidly cooled and are solidified as grains.

2. A device for manufacturing a powder of amorphous ceramic or metallic particles comprising: an autoclave, a heated melting crucible situated in said autoclave, means for feeding ceramic or metallic preforms to said crucible, means



for heating said crucible to melt the preforms, a spray nozzle, a duct connecting the melting crucible with said spray nozzle, said spray nozzle having an orifice directed vertically upwards, a levitation acoustic emitter disposed such as to create a levitation acoustic field within said autoclave in the area in front of the nozzle orifice, and means for injecting an inert cooling gas into said area, by which a turbulent gas flow is created therein, whereby droplets of said substance in the liquid state, sprayed out of the nozzle are rapidly cooled and are solidified as amorphous grains.

4,966,738

MOLD CLAMPING FORCE ADJUSTMENT METHOD

Yoshiharu Inaba, Kawasaki, and Masao Kamiguchi, Oshino, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

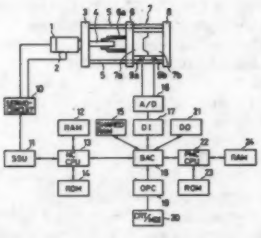
PCT No. PCT/JP88/01186, § 371 Date Apr. 13, 1989, § 102(e) Date Apr. 13, 1989, PCT Pub. No. WO89/06185, PCT Pub. Date Jul. 13, 1989

PCT Filed Nov. 24, 1988, Ser. No. 340,008

Claims priority, application Japan, Dec. 25, 1987, 62-327517

Int. Cl.[5] B29C *45/64, 45/76*

U.S. Cl. 264—40.5 **3 Claims**



1. A mold clamping force adjustment method for maintaining a mold clamping force of a molding machine at a constant value comprising the steps of:

(a) detecting and storing a mold touch position, a thickness and a temperature of a mold during a mold thickness adjustment process;

(b) detecting the temperature of the mold in each molding cycle after a molding operation that includes a sequence of molding cycles is started;

(c) obtaining the thickness of the mold in each of the molding cycles, based on the detected temperature of the mold and the temperature and thickness of the mold which are stored in said step (a);

(d) obtaining a position of a movable platen necessary for producing a predetermined mold clamping force, based on the thickness of the mold obtained in said step (c); and

(e) producing and said predetermined mold clamping force by moving the movable platen to said position obtained in said step (d).

4,966,739

PROCESS FOR MAKING GYPSUM FIBERBOARD

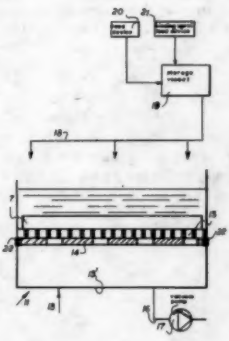
Josef Stipek, Bad Hersfeld; Friedrich Bahner, Rotenburg a.d.G.; Horst Hose, Kassel; Karl Freisinger, Bad Hersfeld, and Helmut Eidam, Schenklengsfeld, all of Fed. Rep. of Germany, assignors to Babcock-Bsh Aktiengesellschaft Vormals Buttner-Schilde-Haas AG, Krefeld, Fed. Rep. of Germany

Continuation of Ser. No. 198,945, May 26, 1988, abandoned. This application Jan. 10, 1990, Ser. No. 463,916

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719065; Sep. 26, 1987, 3732497

Int. Cl.[5] B29B *15/06;* **B28B** *17/02;* **B29C** *71/00*

U.S. Cl. 264—87 **6 Claims**



1. A process for making gypsum fiberboard comprising the consecutive steps of:

(a) molding and then cutting boards from a mash containing a calcium sulfate dihydrate and a fibrous material which releases setting-retardant impurities upon heating;

(b) autoclave heating said mash formed into said boards at a temperature between about 115° C. and 180° C. to convert said calcium sulfate dihydrate to a water-poor form of calcium sulfate and forming settingretardant impurities in said board;

(c) cooling the heated mash in the form of said boards;

(d) drawing or forcing an aqueous liquid through said boards subsequent to steps (b) and (c) to remove said setting-retardant impurities; and

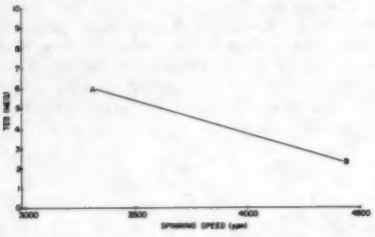
(e) finally exposing said boards to temperature and humidity conditions sufficient to convert said water-poor form of said calcium sulfate again into said calcium sulfate dihydrate thereby setting said boards.

4,966,740

TEXTURING POLYESTER YARNS

Cecil E. Reese, Kinston, N.C., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 907,300, Sep. 12, 1986, Pat. No. 4,833,032.
This application Jan. 23, 1989, Ser. No. 299,981
Int. Cl.[5] D01D *5/22, 5/12*
U.S. Cl. 264—103 3 Claims



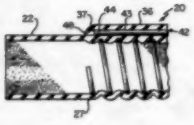
1. A continuous process for preparing polyester draw-texturing feed years, involving the steps of first forming a molten polyester by reaction, in the presence of catalysts therefor, (a) of ethylene glycol with terephthalic acid, esters, or both, thereof, followed by (b) polycondensation and then melt-spinning the resulting molten polyester into filaments and withdrawing them at a speed of about 3,000 to 4,000 mpm to provide partially oriented yarns of low crystallinity, wherein the polyester is modified by introducing into the polymer, as a solution in ethylene glycol, tetraethyl silicate in a small amount, measured as microequivalents per gram of polymer (MEQ), that depends on the speed (V), in ypm at which the filaments are withdrawn, the optimum amounts being as indicated by the line AB of FIG. 1 of the accompanying drawings.

4,966,741

METHOD OF MAKING SHAPE RETENTION HOSE CONSTRUCTION

James B. Rush, Springfield, Mo.; James S. Bryan, Clyde; Pearison W. Henry, Sylva, and Richardson J. Trantham, Clyde, all of N.C., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Nov. 14, 1988, Ser. No. 270,140
Int. Cl.[5] B28B *1/48*
U.S. Cl. 264—154 7 Claims



1. In a method of making a shape retention hose construction comprising a length of flexible tubular hose formed mainly of polymeric material and having opposite end portions and an intermediate body portion that defines internal and external peripheral surfaces of said hose, and shape retention means carried by said hose and being adapted to generally retain the shape of said hose construction when said hose and its carried shape retention means are jointly bent into a particular shape, said shape retention means comprising a deformable elongated member having opposed ends, said hose having a radially outwardly disposed and longitudinally extending projection on said external peripheral surface thereof, said elongated member being longitudinally disposed in said projection, the improvement comprising the steps of forming said projection with opposed ends that respectively are disposed inboard of said opposite end portions of said hose, forming said opposed ends of said elongated member to also be respectively disposed inboard of said opposite end portions of said hose, forming said end portions of said hose to respectively have external peripheral surfaces that have substantially circular cross-sectional configurations throughout the axial lengths thereof, forming said opposed ends of said elongated member to be respectively disposed inboard of said opposed ends of said projection, and forming said opposed ends of said projection to respectively have openings therein that are respectively aligned with said opposed ends of said elongated member to permit said ends of said elongated member to move in said openings relative to said projection when said hose construction is bent in a certain manner.

4,966,742

PREPARATION OF THIN CERAMIC SHEETS

Issam A. Khoury, 110 Marlboro Rd., Southboro, Mass. 01772; Robert H. Heistand, II, 10 Donnell Rd., Walpole, Mass. 02032, and Iwao Kohatsu, 46 Reed St., Lexington, Mass. 02173

Filed Aug. 20, 1985, Ser. No. 767,451
Int. Cl.[5] C04B *33/28*
U.S. Cl. 264—166 20 Claims

1. A process for the preparation of free-standing, thin, precursor ceramic tapes, the process comprising:

(a) preparing a solution comprising a coordination complex, a solvent, and a binder, the coordination complex comprising at least one metal selected from lead and the metals of Group IIA, and at least one metal from Group IIIB, IVA, IVB, VB, VIB, VIIB or VIII, and an organic moiety having vicinal hydroxyl moieties, vicinal carboxylic acid moieties, or a hydroxyl moiety vicinal to a carboxylic acid moiety; the binder and solvent being such that the viscosity of the solution is suitable for tape preparation; and

(b) preparing a free-standing precursor tape from the solution.

4,966,743

PROCESS FOR MAKING ULTRATHIN POLYMERIC IMINE FILMS

Alan K. Engel, Tokyo, Japan, assignor to Research Development Corporation of Japan, Tokyo, Japan, a part interest

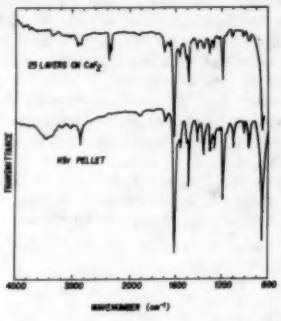
Division of Ser. No. 63,441, Jun. 18, 1987, Pat. No. 4,778,720, which is a division of Ser. No. 788,497, Oct. 17, 1985, Pat. No. 4,681,799. This application Jun. 7, 1988, Ser. No. 203,081
Claims priority, application Japan, Nov. 1, 1984, 59-229003
Int. Cl.[5] B29D *7/01;* B29C *41/12*
U.S. Cl. 264—298 8 Claims

1. A process for making an ultrathin film comprising a polymeric imine which comprises the repeat unit

[CHR:CH=NR'N]

in which R is aromatic, olefinic, acetylenic, or a mixture of these, and R' is aromatic, olefinic, acetylenic, or a mixture of these, said film comprising one or more unit layers or comprising built-up multilayers which include one or more of said unit layers, said process comprising the steps of spreading an essentially monomeric polyfunctional aldehyde or essentially monomeric polyfunctional aldehyde precursor on the surface of an aqueous subphase solution containing an essentially monomeric polyfunctional amine, and allowing the reaction to pro-

ceed between the spreading layer of aldehyde component on the surface of said aqueous subphase solution and said essentially monomeric polyfunctional amine in said subphase solution, the aldehyde component being self-spreading or spreadable with a solvent and remaining at the surface for the duration of the reaction, wherein said polyfunctional aldehyde or polyfunctional aldehyde precursor is selected from the group consisting of aromatic, olefinic, acetylenic moities and mixtures thereof and wherein said polyfunctional amine is selected from the group consisting of aromatic, olefinic, acetylenic moities and mixtures thereof.



4,966,744

APPARATUS AND METHOD FOR INJECTION MOULDING A THIN-WALLED CONTAINER HAVING A BASE WALL WITH A PLANAR INTERIOR SURFACE

Jens O. Sorensen, P.O. Box 2274, Rancho Santa Fe, Calif. 92067

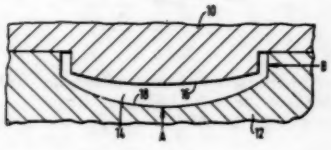
PCT No. PCT/GB87/00710, § 371 Date Mar. 31, 1989, § 102(e) Date Mar. 31, 1989, PCT Pub. No. WO88/02686, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 7, 1987, Ser. No. 346,021

Claims priority, application United Kingdom, Oct. 7, 1986, 8624056

Int. Cl.[5] B29C *45/00*

U.S. Cl. 264—328.1 **14 Claims**



1. An method of moulding by side injection a thin-walled container having a base wall with planar surface and side walls, comprising the steps of forming the container with a core piece co-operable with a cavity piece and defining a space therebetween in which said container is to be moulded: and filling the space with heated plastic material injected through a gate located adjacent the space defining the side walls, wherein a surface of the cavity piece for forming an exterior base wall of the container is concave so that when the container has cooled the base wall is substantially planar.

4,966,745

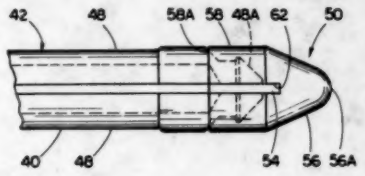
FUEL ROD GRIPPER END CAP FOR MINIMIZING IMPACT WITH GRID CELL DIMPLES

Wade H. Widener, and David A. Boatwright, both of Columbia, S.C., assignors to Westinghouse Electric Company

Filed Jun. 28, 1989, Ser. No. 372,482

Int. Cl.[5] G21C *19/00*

U.S. Cl. 376—264 **8 Claims**



1. In combination with a fuel rod gripper having a plurality of circumferentially-spaced and longitudinally extending slots defining a plurality of gripping fingers with end portions radially expandable and retractable between corresponding expanded and collapsed conditions, an end cap comprising:

(a) a body having a forward camming portion and a rearward hollow mounting portion, said mounting portion being configured to fit over and cover the end portions of the gripper fingers with said forward camming portion extending forwardly thereof; and

(b) a plurality of circumferentially-spaced and longitudinally-extending attachment flutes disposed internally of said hollow mounting portion of said body and projecting radially inwardly therefrom, said flutes being configured to releasably fit within the respective slots of the gripper when the finger end portions thereof are in the expanded condition and to be retained therein when the finger end portions are in the retracted condition.

4,966,746

ULTRASONIC EXAMINATION OF BWR SHROUD ACCESS COVER PLATE RETAINING WELDS

David L. Richardson, Los Gatos; Jack P. Clark; Balasubramanian S. Kowdley, both of San Jose; Peter M. Patterson, Livermore; Richard W. Perry, and Thurman D. Smith, both of San Jose, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jan. 3, 1989, Ser. No. 293,158

Int. Cl.[5] G21C *17/00*

U.S. Cl. 376—249 **6 Claims**

1. A process for the inspection of a welded shut hatch cover plate at the peripheral ledge forming the boundary between the plenum below the flooded core of a boiling water nuclear reactor and the upwardly exposed and flooded shroud annulus for recirculating the water for reactor forced circulation, the inspection process occurring in a boiling water nuclear reactor during an outage when the reactor steam dome, steam dryer, and steam separator are removed for direct access to the interior of the flooded reactor, the process comprising the steps of:

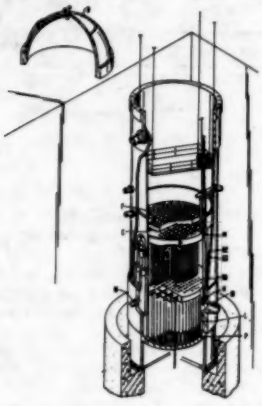
providing a submersible housing having a top side with at least one attachment point and a lower rotative pedestal for the resting support of the housing on said pedestal;

providing a first motor mounted to said submersible housing operatively connected to said pedestal for causing said housing to rotate relative to said pedestal;

providing an ultrasound transducer mounted on a longitudinally sliding mount, said ultrasound transducer focused downwardly from an opening in the bottom of said submerged housing, said ultrasound transducer connected for longitudinal logging excursion of metal immediately underlying said housing when said housing rests at said pedestal on said metal;

providing a second motor mounted to said submersible housing said motor operatively connected to said sliding mount for causing longitudinal excursion of said ultrasound mount for ultrasonic inspection of welds under said housing;

lowering said submersible housing from a support point in the top of said housing in the defined shroud annulus between the flooded reactor vessel core and reactor vessel sidewall into the bottom ledge of said upwardly exposed shroud annulus;



placing the pedestal of said housing on the center of said cover plate to be inspected at the end of said lowering steps;

driving said first and second motors for combined longitudinal excursion of said ultrasound transducer and incremental rotation of said housing on said pedestal for logged ultrasound inspection of said cover plate, weld and peripheral ledge adjacent said cover plate.

4,966,747

HYDRO-BALL IN-CORE INSTRUMENTATION SYSTEM AND METHOD OF OPERATION

Stephen N. Tower, Washington Township, Westmoreland County; Luciano Veronesi, O'Hara Township, Allegheny County, and Howard E. Braun, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 24, 1987, Ser. No. 42,183
Int. Cl.[5] G21C *17/10*
U.S. Cl. 376—254 **31 Claims**

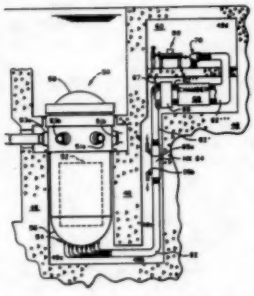
1. An instrumentation system for a pressure vessel of a nuclear reactor, the vessel having an outer enclosure defined by a generally cylindrical sidewall with a generally vertical central axis and upper and lower edges, and top and bottom heads secured in sealed relationship to the upper and lower edges, respectively, of the cylindrical sidewall, and the vessel enclosing therein a core including a plurality of elongated fuel element assemblies mounted in parallel axial relationship, the instrumentation system comprising:

plural detector strings, each detector string comprising an elongated flexible wire, a plurality of balls fixedly mounted on said wire, along a diameter of each ball and at spaced positions along the length of the wire, and first and second tips secured to the first and second, opposite ends of the wire and defining a maximum diameter of the detector string, the detector string being receivable in a confining structure defining an elongated interior passageway of an internal diameter accommodating the maximum diameter of the string and receiving a flow of liquid in a selected direction through the passageway for transporting the detector string by flow-induced drag in the selected direction through the passageway, the balls being of a material responsive to radiation and having a predetermined half life;

plural instrumentation thimbles, each of elongated and generally cylindrical sidewall configuration and defining an interior, elongated passageway as aforesaid, and having an open first end, a closed second end and having flow holes in the sidewall adjacent the second end, said thimbles being disposed in generally parallel axial relationship within the reactor core at predetermined locations relative to the fuel element assemblies;

a chamber, exterior of the vessel, comprising plural storage positions, each defining an interior passageway, as aforesaid, for storing a corresponding plurality of respective detector strings; and

a transport system for selectively transporting the plural detector strings from the chamber to inserted positions within the respective, plural instrumentation thimbles for



sensing the corresponding levels of radiation within the core, and from the inserted positions within the thimbles for return to the chamber, the transport system comprising:

plural first means for defining corresponding interior passageways, as aforesaid, connected to and extending from corresponding positions of the chamber and through the vessel enclosure, in sealed relationship therewith, to respective, predetermined positions within the vessel disposed in alignment with and spaced from the first ends of the respective instrumentation thimbles;

plural second means for defining corresponding interior passageways, as aforesaid, respectively associated with said plural first means and extending from the corresponding said predetermined positions to the first ends of the respective thimbles and in alignment therewith;

plural third means, at said predetermined positions, for detachably joining the respective first and second means and interconnecting said respective interior passageways thereof in sealed relationship;

plural fourth means for detachably joining said second means to the first ends of the respective thimbles and interconnecting said interior passageways thereof in sealed relationship; and

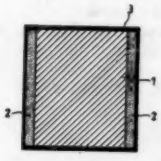
means for selectively producing a flow of primary coolant through the successive and respective, plural interior passageways of said chamber, of said first and second means, and of said thimbles, in a first direction for transporting the corresponding plural detector strings from the chamber and into the inserted positions within the respective thimbles, and in a second, opposite direction for withdrawing the detector strings from within the respective instrumentation thimbles and transporting same to the respective storage positions in said chamber.

4,966,748

METHODS OF PRODUCING CLAD METALS

Akihiro Miyasaka, and Hiroyuki Ogawa, both of Sagamihara, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 7, 1990, Ser. No. 490,704
Claims priority, application Japan, Mar. 24, 1989, 1-70338
Int. Cl.[5] B22F 7/00
U.S. Cl. 419—8 **9 Claims**



1. A method of producing a clad metal comprising the steps of:

forming a layer of a dissimilar metal powder on the surface of a base metal by cold fixing the powder to the surface under pressure;

densing only the surface and a subsurface area of the layer of the dissimilar metal powder by melting and immediately solidifying in a vacuum;

compressing the layer of the dissimilar metal powder together with the base metal at a temperature not higher than the solidus-line temperature of the two dissimilar metals under a pressure of not lower than 300 kgf/cm^2 using a hot isostatic press; and

hot working the layer of the dissimilar metal together with the base metal.

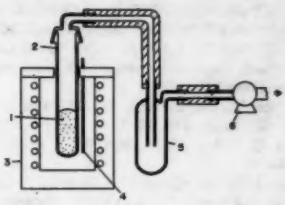
4,966,749

MANUFACTURING PROCESS FOR CHEVREL PHASE COMPOUNDS

Shigeo Kondo, and Yasuharu Yamamura, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

PCT No. PCT/JP88/01045, § 371 Date Jun. 15, 1989, § 102(e) Date Jun. 15, 1989, PCT Pub. No. WO89/03368, PCT Pub. Date Apr. 20, 1989
PCT Filed Oct. 14, 1988, Ser. No. 369,556
Claims priority, application Japan, Oct. 16, 1987, 62-262120
Int. Cl.[5] B22F 7/00
U.S. Cl. 419—10 **4 Claims**

1. A process for manufacturing Chevrel phase compounds characterized by sintering a mixture of a sulfide of metal, which metal is at least one element selected from Li, Na, Mg, Ca, Sc, Cr, Mn, Fe, Co, Ni, Cu, Zn, Sr, Y, Pd, Ag, Cd, In, Sn, Ba, La, Pb, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb



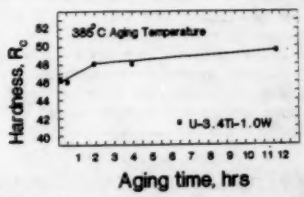
and Lu, metallic molybdenum and molybdenum sulfide under reduced pressure.

4,966,750

HIGH DENSITY-HIGH STRENGTH URANIUM-TITANIUM-TUNGSTEN ALLOYS

Jerry C. LaSalle, Upper Montclair; Ravi Batra, Rockaway, and Donald T. Rorabaugh, Budd Lake, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 26, 1989, Ser. No. 371,856
Int. Cl.[5] C22C 43/00
U.S. Cl. 420—3 **10 Claims**



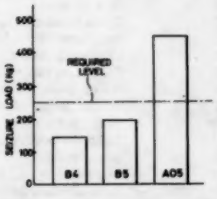
1. A high density uranium-based alloy, consisting essentially of the formula U—Ti_x—W_y where x ranges from about 0.5 to 1.0 and y ranges from about 0.25 to 2.0.

4,966,751

STEEL HAVING GOOD WEAR RESISTANCE

Hiroshi Kaede, Nagoya; Tadahiro Kolke, Tokai; Shinji Kato, Okazaki; Yorishige Maeda; Yoshio Fuwa, both of Toyota; Shigetoshi Sugimoto, Aichi; Hikaru Aoyagi, and Shinzi Shibata, both of Toyota, all of Japan, assignors to Aichi Steel Works, Limited, Tokai and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Jun. 10, 1988, Ser. No. 204,729
Claims priority, application Japan, Nov. 6, 1987, 62-146006; Nov. 9, 1987, 62-230446
Int. Cl.[5] C22C 38/18
U.S. Cl. 420—34 **8 Claims**



1. A steel having good wear resistance consisting essentially of, by weight, 0.55–1.10% of C, 0.1–0.52% of Si, up to 2.0% of

Mn and 20.8–25.0% of Cr, and no intentionally added the remainder being Fe and inevitable impurities.

4,966,753

IMMUNOTHERAPEUTIC METHODS AND COMPOSITIONS EMPLOYING ANTIGENS CHARACTERISTIC OF MALIGNANT NEOPLASMS

John McMichael, Cambridge Springs, Pa., assignor to Molecular Rx, Inc., Nashville, Tenn.

Division of Ser. No. 86,924, Aug. 18, 1987, Pat. No. 4,877,610.
This application Jun. 16, 1989, Ser. No. 367,235
Int. Cl.[5] A61K *39/00, 39/085, 39/40, 45/05*
U.S. Cl. 424—88 **36 Claims**

1. A method for alleviating/alleviating symptoms of malignant neoplasia in a human disease victim comprising the step of administering to said disease victim a member selected from the group consisting of characteristic substances of diseased cells of malignant neoplasia and effective fragments and effective derivatives thereof, in an amount which is less than the lowest amount necessary to provoke a humoral immune response, as exemplified by the presence of a positive wheal upon subcutaneous administration.

21. A pharmaceutical preparation for alleviating non-pain symptoms of malignant neoplasia in a human disease victim comprising:

a member selected from the group consisting of characteristic substances of diseased cells of malignant neoplasia and effective fragments and effective derivatives thereof, in an amount which is less than the lowest amount of the substance necessary to provoke a humoral immune response, as exemplified by the presence of a positive wheal upon subcutaneous administration; and

an immune enhancer in an amount less than the lowest amount of the substance necessary to induce a humoral immune response in combination with said characteristic substance, as exemplified by the presence of a positive wheal upon subcutaneous administration.

4,966,754

PRESERVATION OF COSMETIC COMPOSITIONS

Prakash C. Purohit, and Lal G. Ramdeen, Minneapolis, Minn., assignors to Aveda Corporation, Minneapolis, Minn.

Filed Aug. 8, 1988, Ser. No. 229,234
Int. Cl.[5] A61K *35/78, 7/06*
U.S. Cl. 424—195.1 **2 Claims**

1. A method of preserving a cosmetic composition from microbial action of the microorganisms *Aspergillus niger, Candida albicans, Staphylococcus aureus* and *Pseudomonas aeruginosa* comprising incorporating into said cosmetic composition an essential oil having antimicrobial activity against all four of said microorganisms, wherein said antimicrobial essential oil is a mixture of essential oils having the following composition by weight:

Percentage By Weight	Essential Oil
20.00	Linalool ex Bois de Rose
5.00	Geraniol ex Palmarosa
5.00	Lemongrass 80% rectified
20.00	Bois de Rose
20.00	Cedarwood Oil
5.00	Marjoram Oil
2.00	Cinnamon Bark Oil
2.00	Cardamom Oil
3.00	Neroli Bigarde Petals Oil
2.00	Vanilla Resinoid
5.00	Coriander Oil
2.00	Oakmoss empuree
2.00	Armoise Oil
5.00	Menthol Crystals laevo
2.00	Rose absolute concrete wax

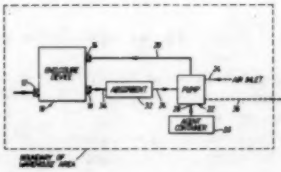
and wherein said antimicrobial essential oil is incorporated into said cosmetic composition by first dissolving said antimicrobial essential oil in a polyoxyethylene sorbitan ester wherein the ratio by weight of said sorbitan ester to said antimicrobial essential oil is in the range of 2:1 to 6:1 and adding said resulting sorbitan ester and essential oil mixture to said cosmetic composition in an amount to provide said antimicrobial essential oil in said cosmetic composition of at least 2% by weight of said cosmetic composition.

4,966,755

METHOD AND APPARATUS FOR FUMIGATION OF MATERIALS

Colin P. Smith, East Grinstead, England, assignor to Rentokil Limited, West Sussex, England

Filed Jun. 1, 1988, Ser. No. 201,046
Claims priority, application United Kingdom, Jul. 9, 1987, 8716133
Int. Cl.[5] A61L *2/00;* **A01M** *13/00;* **F04F** *1/18*
U.S. Cl. 422—28 **20 Claims**



1. A method of fumigating a material with an agent in a gaseous or vapour state, which comprises the steps of totally enclosing and sealing the material within a flexible enclosure device having a port, providing means for supplying the agent to the enclosure device, said means including a pump comprising a chamber containing a heat reservoir in the form of a particulate matter, connecting the port to the agent-supplying means, causing the agent to impinge on said particulate matter, fumigating the material within the device with the agent and, after fumigation, pumping any unused agent or gaseous or vaporous reaction products from the device, and transmitting gas or vapour to an outlet in a region remote from the device.

17. Fumigation apparatus which comprises an enclosure device capable of totally enclosing and sealing an article to be fumigated, the device comprising flexible substantially gas and vapour-impermeable base and cover sheet joined by a substantially gas and vapour-impermeable sliding clasp fastener, the interior of the device being connected by a port to an outlet of a pump, the pump having an inlet chamber for containing a heat reservoir of particulate matter, means for introducing a fumigant into the chamber to impinge on particulate matter therein, and an air inlet to the chamber, whereby a mixture of air and fumigant may be introduced into the device.

4,966,756

METHOD OF STERILIZING ANTHERS

Marat A. Fedin, Dm. Ulitsa Ulyanova, 24, kv. 158; Tatyana A. Kuznetsova, Khoroshevskoe shosse, 36b, kv. 62, both of Moscow; Viktor I. Lysenkov, ulitsa Yakubova, 30, kv. 366; Vitaly I. Talapin, ulitsa Tikotskogo, 42, kv. 12, both of Minsk; Svetlana A. Novikova, ulitsa Shirokaya, 19, korpus 2, kv. 176, Moscow; Leonid V. Polovinkin, ulitsa Zheleznodorozhnaya, 126b, kv. 2, Minsk; Valentin A. Savchuk, Poltavskaya Oblast, Globinsky raion,, selo Ustimovka; Anatoly M. Petrov, ulitsa Engelsa, 12, kv. 3, Minsk; Anatoly I. Sedelnikov, ulitsa Turgeneva, 24b, kv. 54, Gorky; Tatyana S. Tikhonova, ulitsa Aktjubinskaya, 3, kv. 5; Nina P. Polyakova, ploschad Svobody, 4, kv. 85, both of Gorky, and Sergei I. Paklin, ulitsa Malava Filevskava, 66, kv. 30, Moscow, all of U.S.S.R.

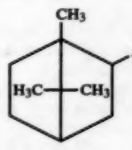
PCT No. PCT/SU88/00061, § 371 Date Jan. 8, 1990, § 102(e) Date Jan. 8, 1990, PCT Pub. No. WO89/08397, PCT Pub. Date Sep. 21, 1989

PCT Filed Mar. 17, 1988, Ser. No. 442,365

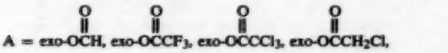
Int. Cl.[5] A01D *91/00*

U.S. Cl. 422—37 4 Claims

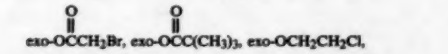
1. A method for sterilizing anthers by applying to said anthers a sterilizing agent in combination with a diluent during the period of the fifth and/or sixth stage of organogenesis, wherein said sterilizing agent are terpenoid compounds having the following general formula:



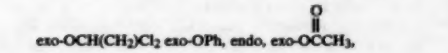
wherein:



A = exo-OCH, exo-OCCF$_3$, exo-OCCCl$_3$, exo-OCCH$_2$Cl,



exo-OCCH$_2$Br, exo-OCC(CH$_3$)$_3$, exo-OCH$_2$CH$_2$Cl,



exo-OCH(CH$_2$)Cl$_2$ exo-OPh, endo, exo-OCCH$_3$,

or mixtures thereof.

4,966,757

SULFUR DIOXIDE GENERATOR

Richard A. J. Lewis, 1101 Lamplighter, RiverHeights, Logan, Utah 84321, and Donald C. Forbush, 2882 Cave Hollow Way, Bountiful, Utah 84321

Continuation-in-part of Ser. No. 129,044, Dec. 8, 1987, abandoned, which is a continuation-in-part of Ser. No. 940,786, Dec. 9, 1986, abandoned. This application Mar. 22, 1989, Ser. No. 327,240

Int. Cl.[5] C01B *17/54*

U.S. Cl. 422—62 18 Claims

1. In an apparatus for burning sulfur with oxygen containing air comprising:

a primary sulfur-burning chamber defined by an enclosure with a gas outlet, said enclosure holding a pool of molten sulfur therein, a sulfur inlet at a first, lower elevation of the enclosure for feed of sulfur into the primary sulfur-burning chamber, and having:

ignition means positioned to contact the sulfur within the primary sulfur-burning chamber to ignite and start the exothermic sulfur combustion reaction within said primary sulfur-burning chamber; and

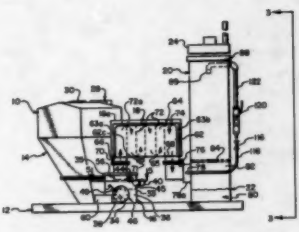
a primary air inlet positioned in the enclosure so that air will flow in a tangential direction at a second, relatively higher elevation of the enclosure above the sulfur inlet for introduction of air tangentially into the primary sulfur-burning chamber to introduce a substantial amount of air used for burning and vaporizing the sulfur supplied thereto to form an effluent gas containing sulfur, sulfur dioxide, and oxygen;

a sulfur feed tank for supplying sulfur to the primary sulfur-burning chamber, the sulfur feed tank being adapted to receive heat from the primary sulfur-burning chamber for the melting of sulfur in the sulfur feed tank;

a conduit leading from the sulfur feed tank to the sulfur inlet for transferring sulfur from the sulfur feed tank to the primary sulfur-burning chamber, the cross-sectional area of the conduit from the tank being sized to allow sufficient sulfur into the burning chamber to supply the optimal burning rate, while providing sufficient flow resistance to the sulfur to prevent the primary burning chamber from entirely filling with sulfur;

a secondary sulfur-burning chamber having

a gas inlet in communication with the gas outlet from the primary sulfur-burning chamber enclosure at a first end of the sulfur-burning chamber to receive effluent gas containing sulfur, sulfur dioxide, and oxygen discharged from the gas outlet of the primary sulfur-burning chamber, and



a secondary air inlet proximate the first end of said secondary sulfur-burning chamber to allow desired amounts of oxygen-containing gas to enter the secondary sulfur-burning chamber;

means defining a tortuous flow path of said secondary sulfur-burning chamber for causing turbulent flow of gas passing therethrough for combustion with the secondary air of substantially all of the sulfur in the effluent gas to sulfur dioxide;

a gas outlet at a second end of said secondary sulfur-burning chamber to transmit burned gases out of the secondary sulfur-burning chamber, wherein the improvement comprises:

negative pressure means operably connected to the primary and secondary sulfur-burning chambers for creating negative pressure within the primary and secondary sulfur-burning chambers to draw in desired amounts of oxygen-containing gas into said chambers through the first and secondary air inlets; and

means connected to the secondary air inlet to variably control the amount of air drawn through the secondary air inlet, thereby controlling the amount of oxygen-containing air entering the primary and secondary sulfur-burning chambers in response to a pH measurement.

4,966,758

VACUUM AMPULE FILTRATION DEVICE

William E. Belt, Kansas City, Mo., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Apr. 15, 1988, Ser. No. 181,876

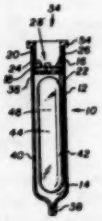
Int. Cl.[5] B01D *29/01*

U.S. Cl. 422—101 13 Claims

1. A diagnostic test device for filtering small quantities of a liquid sample comprising;

a flexible outer vessel having an opening at a first end, a sealed second opposite end and closed sidewalls; and

a filter diposed proximate said opening and substantially sealing said opening against the passage of air when wet; and



an evacuated and sealed frangible inner vessel, said evacuated and sealed frangible inner vessel when ruptured being effective to create a vacuum in said outer vessel, thereby drawing said liquid through said filter so as to filter said liquid.

4,966,759

FLUID PURIFICATION

Michael K. Robertson, and Robert B. Henderson, both of London, Canada, assignors to Nutech Energy Systems Inc., London, Canada

Division of Ser. No. 94,000, Sep. 4, 1987, Pat. No. 4,892,712. This application Sep. 7, 1989, Ser. No. 403,943

Int. Cl.[5] B01J *19/08*

U.S. Cl. 422—186 **8 Claims**

1. A matrix for use in a method of removing, reducing or detoxifying organic pollutants from a fluid, comprising a substrate in the form of a plurality of layers of a filamentous, fibrous or stranded base material, and a photoreactive metal semiconductor material bonded with, to or into surfaces of said layers, at least one of said layers being at least partially transparent to light at a wavelength to which the semiconductor material photoreacts.

4,966,760

METHOD FOR RECOVERING CHROMIUM FROM CHROMIUM-BEARING MATERIAL

Judith A. Ladd, 227 Pennsylvania Ave., Apt. #7, Sayre, Pa. 18840, and Joseph E. Ritsko, 9 Foster Rd., Towanda, Pa. 18848

Continuation of Ser. No. 236,882, Aug. 26, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,078

Int. Cl.[5] C01G *37/00*; C22B *34/32*

U.S. Cl. 423—53 **1 Claim**

1. A method for recovering chromium from chromium-bearing material, said method comprising:

(a) heating said material containing one or more of the elements of cobalt, nickel, iron, molybdenum and tungsten with solid sodium hydroxide, with the amount of said sodium hydroxide ranging from the stoichiometric amount required to convert said chromium and any molybdenum and tungsten contained in said material to their respective water soluble forms to about three times the weight of said material, in an air atmosphere at a temperature of from about 850° C. to about 925° C. to form a fused material containing water soluble compounds of chromium, and any molybdenum and tungsten contained in said material;

(b) cooling said fused material;

(c) contacting said fused material with water to solubilize said water soluble salts and form a leach solution and a residue;

(d) separating said residue from said leach solution;

(e) adjusting the pH of said leach solution to from about 5.5 to about 7.0 with sulfuric acid;

(f) adding a sufficient amount of a water soluble calcium salt to the resulting pH adjusted leach solution to form a precipitate of insoluble calcium salts of any molybdenum and tungsten contained in said leach solution said amount being from about greater than one to about 1.5 times the stoichiometric amount required to reduce hexavalent chromium to the trivalent state, and a chromium-rich liquor containing essentially all of said chromium;

(g) separating said insoluble calcium salts from said chromium-rich liquor;

(h) adjusting the pH of said chromium-rich liquor to from about 1 to about 3 with sulfuric acid;

(i) adding a sufficient amount of sodium metabisulfite to the resulting pH adjusted chromium-rich liquor to reduce the chromium to the trivalent state;

(j) adjusting the pH of the resulting reduced chromium-rich liquor to from about 6.0 to about 7.5 with a base to form a precipitate of essentially all of said chromium and a spent mother liquor; and

(k) separating said precipitate of chromium from said spent mother liquor.

4,966,761

PROCESS FOR TREATMENT OF FLYASH

Vaikuntam I. Lakshmanan, Mississauga; Dzinaars Melnbardis, Rexdale; Robert A. Geisler, North York, and Nairn M. McQueen, Dundas, all of Canada, assignors to Carbovan Inc., Mississauga, Canada

Continuation-in-part of Ser. No. 131,689, Nov. 12, 1987, abandoned, which is a division of Ser. No. 59,363, Jun. 8, 1987, Pat. No. 4,798,709. This application Jul. 14, 1988, Ser. No. 220,763

Claims priority, application Canada, Sep. 8, 1986, 517717

Int. Cl.[5] C01B *33/26*

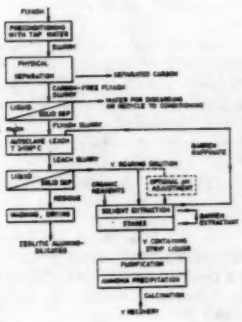
U.S. Cl. 423—118 **6 Claims**

1. In a process for the recovery of zeolitic alumino-silicates from flyash and fine carbon-bearing waste product particles originating in fuel processing plants, in which flyash and waste product particles have been first subjected to a physical separation step to obtain a fine carbon product and substantially carbon-free alumino-silicate containing particles, and then to forming a slurry of said particles in an alkali metal hydroxide

solution, subjecting said slurry to leaching at over-atmospheric pressure at a temperature above the atmospheric boiling point of said solution, and thereafter separating the leached slurry to yield a leach liquor and a leach residue, the improvement comprising;

forming a slurry of alumino-silicate containing particles in an alkali metal hydroxide solution having a concentration of less than 5 moles per litre, subjecting said slurry to leaching at over-atmospheric pressure, separating the leached slurry to yield a leach liquor and a leach residue, therafter treating the separated leach residue to recover zeolitic alumino-silicates therefrom, performing said process steps without adding a reagent to provide a luminium to silicon ratio required in the formation of seolitic alumino-silicates, and treating the separated leach liquor to recover at least one metal selected from the group consisting of vanadium, molybdenum and gallium therefrom, by solvent extraction steps utilizing a solvent extractant mixture comprising a quarternary amine, an oxine derivative and isodecanol.

4. In a process for the recovery of zeolitic alumino-silicates from flyash and fine carbon-bearing waste product particles originating in fuel processing plants, in which flyash and waste



product particles have been first subjected to a physical separation step to obtain a fine carbon product and substantially carbon-free alumino-silicate containing particles, and then to forming a slurry of said particles in an alkali metal hydroxide solution, subjecting said slurry to leaching at over-atmospheric pressure at a temperature above the atmospheric boiling point of said solution, and thereafter separating the leached slurry to yield a leach liquor and a leach residue, at the improvement comprising;

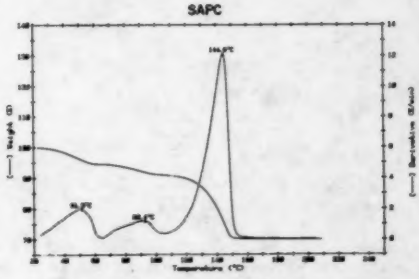
forming a slurry of alumino-silicate containing particles in an alkali metal hydroxide solution having a concentration of less than 5 moles per litre, subjecting said slurry to leaching at over-atmospheric pressure, separating the leached slurry to yield a leach liquor and a leach residue, therafter treating the separated leach residue to recover zeolitic alumino-silicates therefrom, performing said process steps without adding a reagent to provide the aluminum to silicon ratio required in the formation of zeolitic alumino-silicates, and treating the separated leach liquor to recover at least one metal selected from the group consisting of vanadium, molybdenum and gallium therefrom by utilizing a strong base anion exchange resin extraction and elution step sequence.

4,966,762

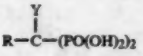
PROCESS FOR MANUFACTURING A SODA ASH PEROXYGEN CARRIER

Henry A. Pfeffer, Mercerville, and William A. Hills, Lawrenceville, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Oct. 6, 1988, Ser. No. 254,063
Int. Cl.[5] C01B *15/10*
U.S. Cl. 423—415 P **2 Claims**



1. A process for manufacturing a soda ash peroxygen carrier composition comprising incorporating into an aqueous solution of 50% to 80% by weight hydrogen peroxide a diphosphonic acid or salt having a formula of



wherein Y is hydrogen or hydroxyl, R is hydrogen or an aliphatic group having one to six carbons, to form a mixed solution, uniformly applying the mixed solution to a solid particulate reaction mixture initially comprising substantially anhydrous particles of sodium carbonate, concomitantly urging water vapor from the surface of the reaction mixture, and maintaining the temperature of the reaction mixture between about 35° C. and 80° C., said diphosphonic acid or salt being present in an amount to provide 0.1% to 3% diphosphonic acid or salt in the composition thereby providing as product a soda ash peroxygen carrier assaying 45% to 75% as sodium carbonate perhydrate and containing between 1 to 5 moles of sodium carbonate for each mole of available water in the composition, said available water consisting essentially of water chemically available as hydrogen peroxide, water of crystallization and free water.

4,966,763

DIRECT VAPOR/SOLID SYNTHESIS OF MERCURIC IODIDE USING COMPOUNDS OF MERCURY AND IODINE

Nathan L. Skinner, Carpinteria, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jul. 24, 1989, Ser. No. 384,197
Int. Cl.[5] C01G *13/04*
U.S. Cl. 423—491 **23 Claims**

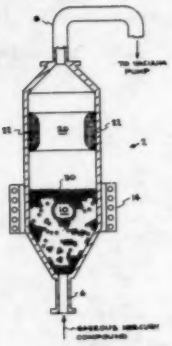
1. A process for producing high purity mercuric iodide which comprises:

(a) providing a gaseous source of a mercuric compound;

(b) providing a particulate bed of an iodide compound;

(c) passing said gaseous source of said mercuric compound through said bed to cause said mercuric compound to react with said iodide compound to form a mercuric iodide vapor reactor product;

(d) flowing said mercuric iodide vapor reaction product from said bed to a separate condensation region; and



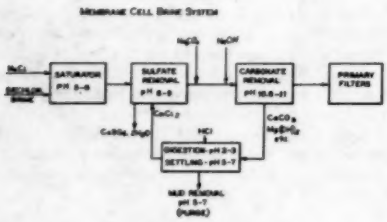
(e) condensing the resultant mercuric iodide vapor reactor product from said particulate bed in said separate condensation region.

4,966,764

PROCESS FOR PRODUCING LOW ALUMINUM MEMBRANE CELL FEEDBRINE

Emily J. Reed, Englewood, and David A. Helmstetter, Cleveland, both of Tenn., assignors to Olin Corporation, Cheshire, Conn.

Filed Feb. 24, 1989, Ser. No. 316,124
Int. Cl.[5] C01D *3/00, 3/16*
U.S. Cl. 423—499 **15 Claims**



1. A process for purifying a dehalogenated alkali metal halide brine containing aluminum as an impurity in a brine system originally supplying saturated brine for an electrolytic cell, the process comprising the steps of:

(a) resaturating the dehalogenated brine;

(b) removing sulfate;

(c) removing carbonate;

(d) creating a calcium chloride feed stream from the carbonate removal site to feed to the sulfate removal site by digesting recycled calcium carbonate settler solids at a pH of about 2.0 to about 3.0 by the addition of an inorganic mineral acid into the solids removed from the calcium carbonate settler to form the calcium chloride feed stream and to solubilize the aluminum, raising the pH of the calcium carbonate settler solids in the calcium chloride feed stream to precipitate aluminum onto undigested carrier particles from the calcium carbonate settler solids; and

(e) removing the precipitated aluminum and the undigested carrier particles from the calcium chloride feed stream.

4,966,765

NOVEL COLEOPTERAN-ACTIVE *BACILLUS THURINGIENSIS* ISOLATE

Jewel Payne; Michelle Burrascano, and George G. Soares, all of San Diego, Calif., assignors to Mycogen Corporation, San Diego, Calif.

Filed Feb. 23, 1988, Ser. No. 159,144
Int. Cl.[5] C12N *1/20*; A61K *39/07*; A01N *63/00, 25/12*
U.S. Cl. 424—93 **12 Claims**

1. A process for controlling coleopteran insect pests which comprises contacting said insect pests with an insect-controlling effective amount of *B. thuringiensis* PS86B1 having the identifying characteristics of NRRL B-18299, or mutants thereof.

4,966,766

CURABLE COMPOSITIONS FOR DENTAL DRUGS HAVING SUSTAINED RELEASE PROPERTY

Mitsuru Atsuta, Nagasaki; Takeshi Sakashita, Yamaguchi; Ryoichi Miyamoto, Kyoto; Yukinori Tanimura, Yamaguchi, and Saburo Fuji, Hiroshima, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 189,528, Apr. 7, 1988, Pat. No. 4,925,660, which is a continuation-in-part of Ser. No. 933,241, Nov. 21, 1986, abandoned. This application Feb. 12, 1990, Ser. No. 478,361
Claims priority, application Japan, Nov. 21, 1985, 60-259900; Jul. 18, 1986, 61-168096; Nov. 4, 1986, 61-260766
Int. Cl.[5] A61F *13/00*
U.S. Cl. 424—422 **3 Claims**

1. A method for preventing or treating dental diseases said method comprising administering to a tooth or an artificial gum of a mammalian organism in need of such treatment an effective amount of a curable composition having a sustained release property which comprises

(a) a (meth)acrylate type monomer,

(b) a polymerization initiator, and

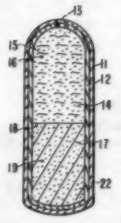
(c) a crude drug ingredient having bactericidal activity.

4,966,767

RUMINANT DISPENSING DEVICE COMPRISING AGENT DISPLACEMENT MEMBER

James B. Eckenhoff, Los Altos, Calif., assignor to ALZA Corporation, Palo Alto, Calif.

Division of Ser. No. 126,460, Nov. 27, 1987, Pat. No. 4,871,544, which is a division of Ser. No. 42,197, Apr. 24, 1987, which is a continuation of Ser. No. 766,456, Aug. 16, 1985, Pat. No. 4,704,118. This application Mar. 23, 1989, Ser. No. 327,935
Int. Cl.[5] A23K *1/18*
U.S. Cl. 424—438 **9 Claims**



1. A delivery system comprising:

(a) a wall surrounding and defining an internal compartment, the wall comprising a composition permeable to the passage of fluid that enters the delivery system;

(b) a beneficial agent in the compartment, said beneficial agent being a member selected from the group consisting

of antibloat, anthelmintics, antibiotic, anti-infectious, antiparasitic, antimicrobial, and antiflea beneficial agents;

(c) exit means in the wall for connecting the internal compartment with the exterior of the delivery system for delivering the beneficial agent from the delivery system;

(d) means in the compartment for urging the beneficial agent through the exit means for delivering the beneficial agent over time; and,

(e) a density member having a specific gravity of 2.2 to 7.6 and selected from the group consisting of iron, steel, iron-magnesium alloy, a mixture of cobalt and iron, copper oxide, iron oxide, and a mixture of copper oxide and iron comprising a specific gravity greater than the specific gravity of fluid that enters the delivery system blended in the means that urges the beneficial agent from the delivery system.

4,966,768

SUSTAINED RELEASE ETODOLAC

John J. Michelucci; Deborah M. Sherman, both of Plattsburgh, and Richard J. DeNeale, Willsboro, all of N.Y., assignors to American Home Products Corporation, New York, N.Y.

Continuation of Ser. No. 100,501, Sep. 24, 1987, abandoned. This application Nov. 7, 1988, Ser. No. 268,646

Int. Cl.[5] A61K *9/22, 9/26*

U.S. Cl. 424—468 **3 Claims**

1. A sustained release dosage form useful in providing once-a-day medication which consists essentially of an admixture of a carrier base material with etodolac and a release rate modifying agent and shaped and compressed to a solid unit dosage form having a regular and prolonged release pattern upon administration, the carrier base material comprising about 18 to 30 weight percent of the solid dosage form and being hydroxypropylmethylcellulose in admixture with 15 to 28 weight percent of the admixture of ethylcellulose, wherein the hydroxypropylmethylcellulose has a hydroxypropoxyl content of about 7.0 to about 8.6 weight percent, a methoxyl content of about 19–24 weight percent, a 2% aqueous solution viscosity of 80 to 120 cps, and an average molecular weight of less than 50,000, the release rate modifying agent being an effective amount of a physiologically acceptable buffer acid, buffer acid salt or mixture thereof.

4,966,769

METHOD FOR DELIVERING DOSAGE FORM FOR DILTIAZEM

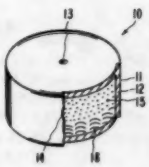
George V. Guittard, Cupertino; Patrick S. L. Wong, Hayward; Felix Theeuwes, Los Altos, and Richard Cortese, Cupertino, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation of Ser. No. 201,519, Jun. 2, 1988, Pat. No. 4,859,470. This application May 11, 1989, Ser. No. 350,440

The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.

Int. Cl.[5] A61K *9/24*

U.S. Cl. 424—473 **5 Claims**



1. A method for delivering diltiazem to a recipient in need thereof, which method comprises:

(a) admitting orally into the recipient a device comprising:

(1) a wall surrounding and forming a compartment, which compartment comprises:

(A) a diltiazem composition comprising from 70 wt % to 96 wt % of a member selected from the group consisting of diltiazem and its pharmaceutically acceptable salts, from 0.5 wt % to 15 wt % of polyacrylic acid comprising a 2,500,000 to 4,000,000 molecular weight, from 0.5 wt % to 20 wt % of a poly(ethylene oxide) comprising a 4,000,000 to 5,500,000 molecular weight, and from 0.5 wt % to 20 wt % of a poly(vinyl pyrrolidone) comprising a 35,000 to 40,000 molecular weight;

(B) a push composition comprising from 70 wt % to 95 wt % of poly(ethylene oxide) comprising a 6,200,000 to 7,500,000 molecular weight, from 1 wt % to 20 wt % of an osmagent, and from 1 wt % to 15 wt % of a hydroxypropylmethylcellulose comprising a 9,000 to 16,000 molecular weight;

(2) at least one passageway in the wall; and,

(b) delivering diltiazem by the device imbibing fluid through the wall into the compartment to cause the diltiazem composition to form a dispensable composition and to cause the push composition to push the diltiazem composition through the passageway for delivering diltiazem to the recipient.

4,966,770

PREDNISONE MICROENCAPSULATED GRANULES

Robert P. Giannini, and Stephen Goodstein, both of Plantation, Fla., assignors to Himedics, Inc., Hollywood, Fla.

Filed Jul. 26, 1989, Ser. No. 385,194

Int. Cl.[5] A61K *9/58, 9/62, 9/26, 9/16*

U.S. Cl. 424—461 **42 Claims**

1. A microencapsulated granule comprising a mixture of about 5% by weight to about 25% by weight prednisone, about 5% to about 25% by weight of a dissolution promoter and about 0.25% to about 1.5% by weight of a binder as an active coating on an inert seed, said granule having an activity density greater than about 0.030 g/ml and a diameter less than about 1000 microns.

4,966,771

GELATIN COATED CAPLETS AND PROCESS FOR MAKING SAME

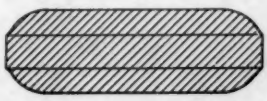
Norbert I. Berta, Radnor, Pa., assignor to McNeilab, Inc., Spring House, Pa.

Division of Ser. No. 16,914, Feb. 20, 1987. This application May 5, 1988, Ser. No. 190,551

The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.

Int. Cl.[5] A01N *25/34*

U.S. Cl. 424—478 **35 Claims**



1. A method for coating a caplet with a gelatinous coating to produce a simulated capsule-like medicament comprising:

(a) providing a holding means having a caplet channel defined therein;

(b) inserting a first end of said caplet into said caplet channel while leaving a second end of said caplet exposed;

(c) applying a gelatinous coating to said second exposed end of said caplet;

(d) permitting said gelatinous coating to dry to form a coated second end;

(e) displacing said caplet through said caplet channel to expose said first end;

(f) applying a gelatinous coating to said first end of said

caplet, said gelatinous coatings on said first and second ends substantially covering said caplet; and

(g) permitting said gelatinous coating on said first end to dry, forming a simulated capsule-like medicament.

35. A caplet with a gelatinous coating produced by the method of claim 1.

4,966,772

DHP DELAYED RELEASE PREPARATION

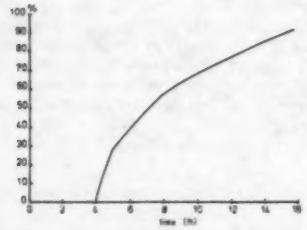
Andreas Ohm, Neuss; Helmut Luchtenberg, Niederkassel; Manfred Bücheler, Overath; Roland Rupp, Leichlingen, and Heinrich Feltkamp, Hennef, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 12, 1989, Ser. No. 336,961

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814532

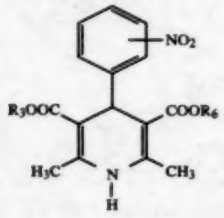
Int. Cl.[5] A61K *9/36*

U.S. Cl. 424—482 3 Claims



1. A tablet having long-lasting action and a corecoat construction, the core containing at least one sparingly soluble dihydropyridine active compound of the formula I,

(I)



in which R_3 and R_6 each independently is alkyl having 1 to 4 C-atoms optionally substituted by alkoxy having 1 to 4 C-atoms, in slow-release form, the coat surrounding the core containing no active compound, dissolving slowly and containing a hydrophilic gel forming polymer selected from the group consisting of modified starch, methylcellulose, hydroxypropylmethylcellulose, hydroxypropylcellulose and sodium carboxy-methylcellulose, the tablet further coated with a rapid-release initial dose of the active compound mixed with a polymer, the core containing at least 50% of the amount of active compound in delayed release form.

4,966,773

TOPICAL OPHTHALMIC COMPOSITIONS CONTAINING MICROFINE RETINOID PARTICLES

Philip D. Gressel, Everman; Robert E. Roehrs, Fort Worth, both of Tex.; John L. Ubels, Milwaukee, and Henry F. Edelhauser, New Berlin, both of Wis., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 934,768, Nov. 25, 1986, abandoned, which is a continuation-in-part of Ser. No. 711,419, Mar. 13, 1985, abandoned. This application Apr. 17, 1989, Ser. No. 339,915

Int. Cl.[5] A61K *9/14, 31/13, 31/20, 31/045*

U.S. Cl. 424—489 7 Claims

1. A method of treating dry eye syndrome and related ophthalmic surface disorders, which comprises applying topically to the affected eye a therapeutically effective amount of a topical, ophthalmic pharmaceutical composition comprising: 0.00001% to 0.1% by weight of a retinoid selected from the group consisting of retinol, retinal, and retinoic acid and its isomers, said retinoid being in the form of microfine particles, the majority of said particles having a maximum diameter of less than 20 microns; and a pharmaceutically acceptable ophthalmic vehicle.

4,966,774

SUPEROXIDE DISMUTASE COMPOSITION

Michinobu Nakano, Ageo, and Kazuo Katoh, Kobe, both of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,300

Claims priority, application Japan, Jul. 12, 1988, 63-171794

Int. Cl.[5] A61K *33/42, 33/14, 31/70, 35/50*

U.S. Cl. 424—601 2 Claims

1. A superoxide dismutase (SOD) composition the following components:

SOD protein	100,000 U,
alkali metal chloride	ca. 0.05 to ca. 50 mg,
phosphate	ca. 0.05 to ca. 20 μmol (as phosphoric acid), and
sucrose	ca. 1 to ca. 150 mg,

together with 0 to about 5 g of other additives such as filters or adjuvants.

4,966,775

BIOCIDAL COMPOSITIONS AND USE THEREOF

Deborah K. Donofrio, The Woodlands, and Wilson K. Whitekettie, Conroe, both of Tex., assignors to Betz Laboratories, Pa.

Continuation-in-part of Ser. No. 242,837, Sep. 12, 1988, Pat. No. 4,855,296. This application May 19, 1989, Ser. No. 354,546

Int. Cl.[5] A01N *33/18, 43/50, 43/66, 59/08*

U.S. Cl. 424—661 18 Claims

1. A bacterial inhibiting composition comprising a synergistic aqueous mixture of (a) 2-bromo-2-nitropropane-1, 3-diol ("BNPD") and (b) an oxidizing biocide selected from the group consisting of hypochlorite, chlorine, and chlorine dioxide, wherein the weight ratio of said BNPD to said oxidizing biocide is from about 7:1 to 1:50.

4,966,776

COMPOSITIONS AND METHODS OF TREATING CALCIUM RENAL STONES

Charles Y. C. Pak, Dallas, Tex., assignor to Board of Regents, the University of Texas System, Austin, Tex.

Continuation of Ser. No. 19,056, Feb. 26, 1987, Pat. No. 4,888,182, which is a continuation-in-part of Ser. No. 741,715, Jun. 6, 1985, abandoned, which is a continuation of Ser. No. 483,678, Apr. 11, 1983, abandoned. This application Sep. 27, 1989, Ser. No. 412,801

Int. Cl.[5] A61K *31/14, 9/20, 9/46, 9/22*

U.S. Cl. 424—677 15 Claims

1. A method for prevention of calcium renal stone formation in a person having hypocitraturia and being susceptible to such stone formation and for dissolution of calcium renal stones and prevention of further calcium renal stone formation in a person having hypocitraturia and being afflicted with calcium renal stones, the method comprising: administering to a person having hypocitraturia a daily oral dosage of a composition comprising potassium citrate, the daily oral dosage containing potassium citrate in an amount between about 30 meq and about 120 meq.

4,966,777

ANTICALCULUS ORAL COMPOSITION

Abdul Gaffar, Princeton; Thomas G. Polefka, Somerset; Robert J. Ferlauto, Jr., Edison, and Rosemarie M. Crisafulli, East Windsor, all of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Division of Ser. No. 312,532, Feb. 17, 1989, Pat. No. 4,906,456, which is a continuation of Ser. No. 842,101, Mar. 20, 1986, Pat. No. 4,806,877, Continuation-in-part of Ser. No. 775,851, Sep. 13, 1989, Pat. No. 4,627,977. This application Dec. 21, 1989, Ser. No. 455,713

The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.

Int. Cl.[5] A61K *7/18*

U.S. Cl. 424—52 16 Claims

1. In an oral composition containing an orally acceptable aqueous vehicle and, in approximate weight amounts and proportions,

A. a mixture of tetrasodium pyrophosphate and tetrapotassium pyrophosphate as effective anticalculus agent, and

B. an amount of a fluoride ion source sufficient to supply 25 ppm to 5,000 ppm of fluoride ions, the improvement in which the tetrapotassium pyrophosphate is a predominant portion of said mixture, which portion is sufficient to inhibit the occurrence of solid gritty particles of tetrasodium pyrophosphate in the composition.

4,966,778

METHOD FOR PRODUCING FROZEN PROOFED DOUGH

Earl J. Benjamin, New Rochelle, N.Y.; Charles H. Ke, Plainsboro, N.J.; Richard B. Hynson, Skillman, N.J., and Chi Ming L. Hsu, Ossining, N.Y., assignors to Kraft General Foods, Inc., Glenview, Ill.

Division of Ser. No. 326,889, Dec. 2, 1981, Pat. No. 4,847,104. This application Jul. 22, 1986, Ser. No. 888,902

Int. Cl.[5] A21D *8/00*

U.S. Cl. 426—19 9 Claims

1. A method for producing a frozen dough for commercial distribution, said dough having improved frozen-storage stability and a wheat protein level of from about 17 to 28% based on the total flour content, comprising the steps of:

(a) preparing a yeast-containing dough by mixing the dough ingredients at a temperature lower than about 30° C., said dough having a wheat protein level of from about 17 to 28% flour basis;

(b) fermenting the resultant dough for at least 5 minutes at below 30° C.;

(c) dividing the fermented dough into separate portions of dough;

(d) forming each portion of fermented dough and proofing to allow additional fermentation, the proofing time being sufficient for each portion of dough to attain a specific volume of from about 1.33 cubic centimeters per gram to about 3.08 cubic centimeters per gram; and

(e) freezing each portion of the proofed dough of step (d).

4,966,779

STABLE, WATER MISCIBLE EMULSION COMPRISING A FAT-SOLUBLE VITAMIN

Paula S. Kirk, Dearborn Heights, Mich., assignor to BASF Corporation, Wyandotte, Mich.

Filed Dec. 21, 1989, Ser. No. 454,202

Int. Cl.[5] A23L *1/302*

U.S. Cl. 426—72 18 Claims

1. A stable, water-miscible emulsion comprising:

A. a fat-soluble vitamin in an amount of from about 5 weight percent to about 55 weight percent; and

B. a liquid, edible vegetable oil which is polyunsaturated to a degree of from about 26 percent to about 78 percent, the vegetable oil being present in an amount of from about 3 weight percent to about 30 weight percent; and

C. a modified lecithin in an amount of from about 0.5 weight percent to about 10 weight percent the lecithin having an HLB value of from about 6 to about 14; and

D. a sucrose ester in an amount of from about 10 weight percent to about 19 weight percent; and

E. sorbitan monooleate in an amount of from about 3.5 weight percent to about 12 weight percent; and

F. a sugar alcohol in an amount of from about 16 weight percent to about 36 weight percent; and

G. water in an amount of from about 5 weight percent to about 30 weight percent; and

H. the emulsion having an average droplet size of from about 0.5 microns to about 8 microns.

4,966,780

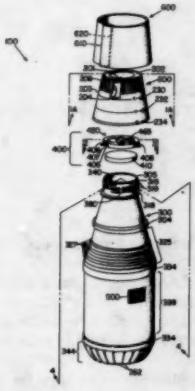
PACKAGING OF FRESH ROASTED COFFEE EXHIBITING IMPROVED AROMA RETENTION

Peter J. Hargraves, Guilford, Conn.; Robert S. Dirksing, and Theodore P. Merz, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 216,554, Jul. 7, 1988. This application May 26, 1989, Ser. No. 358,927

Int. Cl.[5] A23F *5/00*

U.S. Cl. 426—118 35 Claims



1. A semi-rigid, resealable, substantially gas-impervious

package of roasted coffee exhibiting enhanced aroma not only upon initial opening, but throughout its useful life, said package comprising:

(a) a semi-rigid container comprised of substantially gas-impervious polymeric material and including a discharge orifice, said semi-rigid container exhibiting a predetermined shape when both its interior and exterior surfaces are exposed to the atmosphere;

(b) a predetermined quantity of coffee deposited within said semi-rigid container after roasting but before substantial off gassing has been allowed to occur, said roasted coffee containing a substantial quantity of its natural carbon dioxide and other gases at the time it is introduced into said container;

(c) a closure establishing a substantially gas tight seal to the atmosphere across said discharge orifice in said semi-rigid container when said closure is initially applied to said semi-rigid container after filling thereof with said coffee, whereby any gases emitted from said roasted coffee are prevented from escaping from said package, thereby pressurizing the interior of said package relative to the atmosphere and causing predetermined portions of said semi-rigid container to undergo limited deformation without rupturing and without appreciably altering said predetermined shape of said container prior to initial opening thereof by the end user, said closure further including means for establishing a reseal across said discharge orifice of said semi-rigid container after initial opening thereof by the end user, said reseal being effective to substantially resist ambient atmospheric pressure changes and thereby retain enhanced coffee aroma within said package throughout its useful life;

(d) means for preventing said coffee from being aspirated through said discharge orifice of said container when said closure is initially removed from said container; and

(e) vent means which can be placed in fluid communication with the interior of said container to relieve the internal pressure generated from the release of said gases from said coffee before said closure is completely removed from said container.

4,966,781

METHOD OF MAKING A FOOD PRODUCT

Richard Artzer, San Clemente, Calif., assignor to Pizza Stick-Ups Limited Partnership, Forest Park, Ill.

Continuation of Ser. No. 96,552, Sep. 14, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,962

Int. Cl.[5] A23L *1/00*

U.S. Cl. 426—280 **1 Claim**

1. A method of making a food product, comprising the steps of:

compacting food ingredients into a tube to form an elongated edible core;

inserting a stick-like handle into the food ingredient in the tube and allowing the handle to extend out from one end of the core;

cooking said edible core to remove fat and grease and to solidify the contents thereof for good adhesion with said stick-like handle;

removing the cooked food edible core with the stick-like handle;

placing the edible core on a sheet of dough;

placing a metallic prong having a pair of spaced elongated rods abutting said edible core to accelerate the cooking of the food product, said metallic prong extending out of said edible core at an end opposite to the stick-like handle;

wrapping said sheet of dough about a portion of said stick-like handle and about said elongated rods and said edible core;

placing said wrapped edible core in a closed mole;

heating sufficiently said wrapped edible core with the rods in place to bake said wrapped edible core to form a product;

opening said mold and removing said prong from said product to form a pair of spaced cavities in said product;

removing said baked product from the mold; and

filling said cavities with flavoring material.

4,966,782

CHEMICAL LEAVENING SYSTEM

Barbara B. Heidolph, Wentzville, and Frank P. Jakse, Florissant, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 249,938, Sep. 27, 1988, abandoned. This application Jan. 17, 1990, Ser. No. 466,159

Int. Cl.[5] A23L *1/10*

U.S. Cl. 426—551 **9 Claims**

1. A method for leavening a fresh dough product which comprises mixing with flour, water and shortening a leavening system comprising stabilized, x-ray amorphous calcium carbonate as the carbonate factor and a leavening acid.

4,966,783

USE OF SCLAREOLIDE IN AUGMENTING OR ENHANCING THE ORGANOLEPTIC PROPERTIES OF FOODSTUFFS

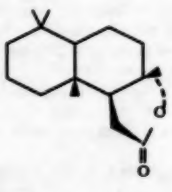
Lawrence Buckholz, Jr., Middletown; Mohamad I. Farbood, Holmdel, both of N.J.; Nicolas Kossiakoff, Chambourcy, France, and Lewis G. Scharpf, Fair Haven, N.J., assignors to International Flavors & Fragrances Inc., New York N.Y.

Division of Ser. No. 474,410, Jan. 2, 1990, which is a continuation of Ser. No. 418,171, Sep. 29, 1989, Pat. No. 4,917,913. This application Jun. 8, 1990, Ser. No. 535,525

Int. Cl.[5] A23G *9/00*

U.S. Cl. 426—565 **1 Claim**

1. A process for improving the mouthfeel and texture of ice cream which is fat-reduced comprising the step of adding to said fat-reduced dairy product a mouthfeel and texture improving quantity of sclareolide having the structure:



4,966,784

METHOD OF PREPARING INTEGRAL MULTILAYER ANALYTICAL ELEMENT

Mitsutoshi Tanaka; Fuminori Arai; Kaoru Terashima, and Nakatsugu Yaginuma, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 73,759, Jul. 15, 1987, Pat. No. 4,871,679. This application Apr. 14, 1989, Ser. No. 339,015

Claims priority, application Japan, Jul. 15, 1986, 61-164570; Jul. 18, 1986, 61-168091

Int. Cl.[5] A01N *1/02*

U.S. Cl. 427—2 11 Claims

1. A method of preparing an integral multilayer analytical element for analysis of calcium compounds comprising, in this order, a water-impermeable light-transmissive support, a reagent layer containing a water-soluble indicator capable of reacting with calcium to produce an optically detectable change, and a porous spreading layer containing an acid capable of decomposing the calcium compounds in a sample which comprises dissolving said acid in an organic solvent which does not dissolve said water-soluble indicator, incorporating this solution into said porous spreading layer, and drying the layer, wherein said integral multilayer analytical element contains a pH buffer capable of maintaining the pH of the reaction with said indicator at its optimum pH incorporated in said reagent layer or an intermediate layer between said reagent layer and said porous spreading layer.

4,966,785

METHOD FOR MAKING A NON-EXTRACTABLE STATIONARY PHASE OF POLYMER WITHIN A CAPILLARY COLUMN

Stephen R. Springston, Middle Island, N.Y., assignor to Associated Universities, Inc., Washington, D.C.

Filed Jul. 3, 1989, Ser. No. 374,984

Int. Cl.[5] B01D *53/00*; B05D *3/02, 3/06*

U.S. Cl. 427—39 10 Claims

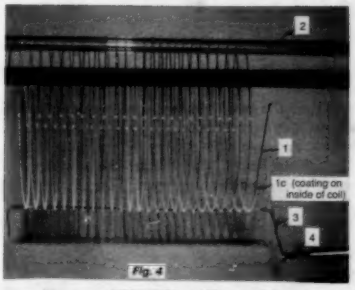


Fig. 4

1. A method of coating the inside surface of a capillary column used for gas chromatography with a cross-linked polymer stationary phase that is relatively non-extractable, comprising the steps;

a. providing a capillary column with a stationary phase polymer coating on the inside surface thereof,

b. exposing said stationary phase coating to a substantially uniformly distributed, low temperature plasma for a predetermined period of time of at least one second, while maintaining a predetermined pressure of at least 0.1 Torr on a plasma-supporting gas selected from the group consisting of argon, helium, xenon, neon, air, nitrogen, or mixtures thereof with any suitable dopant, whereby the stationary polymer phase is converted to a cross-linked form without appreciably diminishing the chromatographic operating efficiency of the column.

4,966,786

CONDITIONING MEANS FOR PRINTED CIRCUITS

Hans-Jürgen Ehrich, and Hartmut Mahlkow, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,533

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3727064

Int. Cl.[5] C23C *26/00*

U.S. Cl. 427—97 6 Claims

1. A conditioning means for protecting a basic material of a printed circuit from aggressive treatment solutions during producing the printed circuit by one of surge and spray processes, said conditioning means comprising an oxidation-insensitive alkali solution containing a halogen-free palladium salt and 2-aminopyridine, having a Ph value of 10–11, and further containing a boron acid.

4,966,787

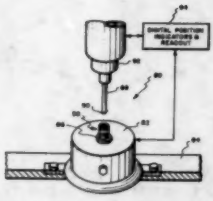
METHOD OF CREATING ISOLATED PLATES ON THE INSIDE SURFACE OF A METALLIZED SUBSTRATE

Lydia J. Young, Palto Alto, Calif., assignor to The Perkin Elmer Corporation, Norwalk, Conn.

Filed Jun. 19, 1989, Ser. No. 367,919

Int. Cl.[5] B05D *3/12, 5/12*

U.S. Cl. 427—106 9 Claims



1. A method of forming an electrostatic deflector for use in controlling an electron beam in an electron beam machine comprising the steps of:

fixing a metallized coated tube which is to form the deflector in a rigid holder,

inserting a scribe tip directly mounted on a rigid bar longitudinally of the bore of the tube and while engaging the tube surface and using the rigidity of the rigid bar withdrawing the tip thereby scribing a thin longitudinal line through the coating,

repeating the scribing step to form a plurality of separated coated areas within the tube.

4,966,788

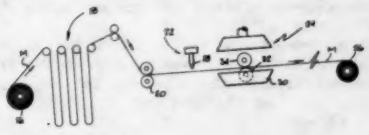
PROCESS FOR MARKING GUIDE LINES ON ROOFING MAT

Edward A. Pell, 3310 Hacienda Way, Antioch, Calif. 94509

Filed May 26, 1989, Ser. No. 357,222

Int. Cl.[5] B05D *5/00, 1/02, 1/36, 7/24*

U.S. Cl. 427—210 8 Claims



1. A method for applying indicia to a fibrous web with paint, comprising the steps of:

continuously moving a fibrous web along a predetermined path;

spraying a relatively small amount of paint onto a major surface of the web, to mark the web the paint comprising pigment in a solvent base; and

applying hot asphalt to the opposite major surface of the web at a location downstream from the paint spraying location to impregnate the web with the hot asphalt, the temperature of the hot asphalt being sufficient to cause evaporation of the solvent, leaving the pigment of the paint in place.

4,966,789

PROCESS OF MANUFACTURING SEAL MEMBERS HAVING A LOW FRICTION COEFFICIENT

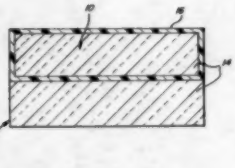
Alfons Knapp, Biberach an der Riss, and Gunter Buzzi, Schiltach, both of Fed. Rep. of Germany, assignors to Masco Corporation of Indiana, Indianapolis, Ind.

Division of Ser. No. 919,266, Sep. 22, 1986, abandoned. This application Jun. 3, 1988, Ser. No. 202,176

Claims priority, application Italy, Feb. 17, 1985, 67138 A/85

Int. Cl.[5] C23C *16/00, 16/26*

U.S. Cl. 427—248.1 **9 Claims**



1. A process for manufacturing a pair of cooperating seal members for valves and faucets and having cooperating surfaces, said process comprising:

formation of both of said seal members from a material suitable to be ground to a precise finish;

coating at least one of said seal members with a layer of material having a hardness coefficient greater than said formation material, said coating material being applied through a process chosen from physical vapor deposition and chemical vapor deposition; and

finishing said cooperating surfaces of said seal members with different coefficients of friction;

whereby said different coefficients of friction of said cooperating seal members reduces adhesion between said cooperating surfaces of said seal members facilitating relative sliding movement of one of said seal members with respect to the other of said seal members within the valve.

4,966,790

COATING COMPOSITIONS

Hiroshi Iizuka; Tadao Iwata, and Shuichi Ishiwata, all of Chiba, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

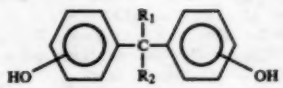
Continuation-in-part of Ser. No. 101,966, Sep. 28, 1987, abandoned. This application Nov. 10, 1988, Ser. No. 270,814

Claims priority, application Japan, Sep. 26, 1986, 61-227479

Int. Cl.[5] B05D *3/00, 3/10*

U.S. Cl. 427—386 **8 Claims**

1. A process for forming a coat which comprises the steps of applying a coating composition comprising an epoxy resin obtained from a bisphenol represented by the formula (I):



[I]

wherein R_1 and R_2 represent a hydrogen atom or an alkyl group containing from 1 to 3 carbon atoms, and a curing agent, to a substrate; and contacting the coat formed on the substrate with a heated liquid having a temperature of less than 100° C. to cure the coat.

4,966,791

METHODS FOR MANUFACTURING TEXTILE MATERIALS

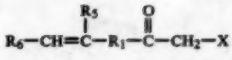
Charles L. Kissell; Jay C. Selover, both of Anaheim, and David M. Ingle, Temple City, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 838,532, Mar. 11, 1986, abandoned. This application Sep. 14, 1989, Ser. No. 408,133

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—389.9 **37 Claims**

1. A method for producing a bonded textile article which comprises contacting a plurality of fibers with a solution of dispersion of a polymer comprising at least about 10 weight percent polymerized, olefinically unsaturated carboxylic acid ester monomers and at least about 0.5 weight percent of at least one polymerizable functional monomer of the formula:



in which R_1 is a divalent organic radical of at least 3 atoms in length, R_5 and R_6 are independently selected from hydrogen, hydroxy, halo, thio, amino or monovalent organic radicals, and X is —CO—R_4 or —CN wherein R_4 is hydrogen or a monovalent organic radical having up to about 10 atoms other than hydrogen under conditions sufficient to combine said polymer with and bond said fibers together.

4,966,792

METHOD OF PRODUCING GRADIENT GEL MEDIUM MEMBRANE FOR ELECTROPHORESIS

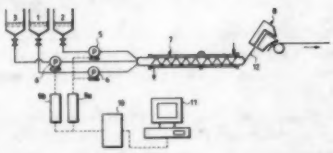
Fumitaka Terai; Kimio Yukawa, and Mineo Suefuji, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 27, 1988, Ser. No. 199,727

Claims priority, application Japan, May 29, 1987, 62-131504

Int. Cl.[5] B05D *3/12*

U.S. Cl. 427—358 **9 Claims**



1. A method for producing a gradient gel medium membrane for electrophoresis containing urea as a modifier, comprising the steps of: mixing high and low concentration monomer solutions with a predetermined quantity of a polymerizing reaction initiator solution with a static mixer to thereby prepare a gel forming solution for electrophoresis, and coating said gel forming solution onto a continuously moving web, the flow-rate ratio of each of said high and low concentration monomer solutions being gradually changed so as to vary the

concentration of monomer in said gel forming solution from low to high for a product length along said web and then from high to low for a following product length.

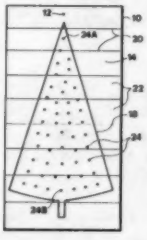
5. The method for producing a gradient gel medium membrane of claim 1, wherein said step of coating comprises extrusion coating.

4,966,793

DECORATIVE WALL HANGING

O. Dexter Covell, 800 Gleason Ave., Langley, Wash. 98260

Filed Jun. 19, 1989, Ser. No. 367,980
Int. Cl.[5] A47G *33/06*; B44F *1/00*
U.S. Cl. 428—7 6 Claims



1. In a decoration, the improvement comprising in combination:

a wall hanging fabricated from sheet material having a compacted position for storage and a stretched position for hanging substantially flat on a wall with an outwardly facing surface and an inwardly facing surface,

an artistic design on said outwardly facing surface,

and ornament positioning means in said artistic design passing between said inwardly and outwardly facing surfaces comprising a plurality of holes,

each of said holes being sized to restrainably hold an ornamental light fixture of an electrically connected string of such light fixtures inserted into said hole from said inwardly facing surface to project through said outwardly facing surface,

said holes being located closer together than the length of said electrical connection between adjacent light fixtures.

4,966,794

ARTIFICIAL STONE MOLDED BODY AND PROCESS FOR FABRICATION THEREOF

Hiroaki Hasegawa; Norio Sakai, and Kazuhiko Osugi, all of Sakai, Japan, assignors to Fukuvi Chemical Industry Co., Ltd., Fukui, Japan

Filed Aug. 4, 1989, Ser. No. 389,887
Claims priority, application Japan, Aug. 15, 1988, 63-201999
Int. Cl.[5] B32B *27/30*; B44F *9/04*
U.S. Cl. 428—15 15 Claims

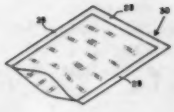
11. An artificial stone formed body which comprises a composition comprising (i) 20 to 80% by weight of a three-dimensionally crosslinked binder resin consisting essentially of 20 to 95% by weight, based on the total monomers, of diethylene glycol bisallyl carbonate and 5 to 80% by weight, based on the total monomers, of methyl methacrylate and (ii) 80 to 20% by weight of an inorganic filler selected from the group consisting of silica and aluminum trihydrate and having a particle size of 1 to 30μ, said composition being obtained by mixing a high-viscosity syrup of a preliminary polymerization product of the ethylene glycol bisallyl carbonate and methyl methacrylate with the inorganic filler, filling the mixture in a mold and polymerizing the mixture in the mold.

4,966,795

MULTIPLE LAYER SHEET STRUCTURES AND PACKAGE

Roger P. Genske, and Yong J. Kim, both of Neenah, Wis., assignors to American National Can Company, Chicago, Ill.

Continuation of Ser. No. 802,910, Nov. 29, 1985, Pat. No. 4,764,404. This application May 5, 1988, Ser. No. 192,415
Int. Cl.[5] B65D *65/40*; B32B *27/08*
U.S. Cl. 428—34.3 12 Claims



1. A multiple layer sheet structure, comprising:

(a) a first layer, the composition of said first layer having (i) about 40% to about 70% of a first component comprising a polypropylene polymer and having (ii) about 60% to about 30% combined of a second component of a polymeric composition providing elastomeric properties, said polymeric composition comprising a first compositional element chosen from the group consisting of ethylene butene-1 copolymer and ethylene propylene copolymer, and a second compositional element, the composition of said second compositional element being a polymeric modifier providing elastomeric properties; and

(b) a second layer adhered to said first layer, the composition of said second layer being selected from the group consisting of polymers, paper, and metal foil.

4,966,796

GRAINS-STORING BAG

Seietsu Aki, Osaka, and Goro Shinjo, Toyonaka, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 10, 1989, Ser. No. 335,364
Claims priority, application Japan, Apr. 15, 1988, 63-94095
Int. Cl.[5] B65D *30/02*; A01N *25/34*
U.S. Cl. 428—34.3 8 Claims

1. A bag for protecting grains from insect pests harmful to stored grains comprising a multi-layer kraft paper laminate comprising (a) one piece of kraft paper treated on one surface with at least one member selected from the group consisting of the following pyrethroid insecticides:

3-phenoxybenzyl chrysanthemate,

3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate,

α-cyano-3-phenoxybenzyl chrysanthemate,

5-benzyl-3-furylmethyl chrysanthemate,

α-cyano-3-phenoxybenzyl 2-(4-chlorophenyl)-3-methylbutyrate,

α-cyano-3-phenoxybenzyl 2,2,3,3-tetramethylcyclopropanecarboxylate,

α-cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate,

α-cyano-3-phenoxybenzyl 3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate,

α-cyano-3-phenoxybenzyl 3-(2-chloro-3,3,3-trifuloro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate,

α-cyano-3-phenoxybenzyl 2-(4-difluoromethoxyphenyl)-3-methylbutyrate,

α-cyano-4-fluoro-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate,

2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether and

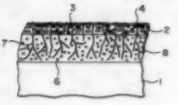
α-cyano-3-phenoxybenzyl 2,2-dimethyl-3-(1,2,2,2-tetrabromoethyl)cyclopropanecarboxylate,
and (b) 1 to 5 pieces of kraft paper containing no pyrethroid insecticide, the surface of the former kraft paper treated with the pryethroid insecticide facing the outside.

4,966,797

PROCESS FOR PRODUCING MAGNETIC RECORDING MEDIUM, MAGNETIC PAINT, AND MAGNETIC DISK

Heigo Ishihara, Tokyo; Akira Osaki, and Takanori Kudo, both of Hachioji, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Dec. 22, 1989, Ser. No. 455,241
Claims priority, application Japan, Dec. 26, 1988, 63-326375
Int. Cl.[5] H01F *10/02*
U.S. Cl. 427—64 **26 Claims**



1. A process for producing a magnetic recording medium which comprises applying a magnetic paint containing at least magnetic particles and a thermally curable binder to a substrate, thermally curing the applied magnetic paint, thereby forming a magnetic film, and impregnating micropores formed in the magnetic film with a lubricant, the magnetic paint further containing a poly(alkyleneoxide)-grafted binder, the grafted poly(alkyleneoxide) moiety being thermally decomposed during the thermal curing, thereby forming the micropores in the magnetic film.

4,966,798

OPTICAL RECORDING MEDIUM

Sibylle Brosius, Mannheim; Helmut Barzynski, Bad Durkheim; Karl-Heinz Feuerherd, Hettenleidelheim; Wolfgang Schrott, Ludwigshafen; Bernhard Albert, Maxdorf; Michael Acker, Heidelberg; Klaus D. Schomana, Ludwigshafen; Harald Kuppelmaier, Heidelberg, and Michael Schmitt, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 363,962
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3820001
int.* Cl.[5] B32B *3/02
U.S. Cl. 428—64 **2 Claims**

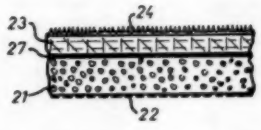
1. An optical recording medium comprising a support material and a light-absorbing layer having a thickness of from 50 to 200 nm consisting essentially of a soluble mixture of a thermoplastic binder and at least one IR dye, wherein the thermoplastic binder is a phenol-aldehyde resin having an average molecular weight of greater than 300 and up to 10,000 which is soluble in an alcohol having a boiling point of less than 200° C.

4,966,799

NOISE-REDUCING STRUCTURAL ELEMENT

Eusebio Lucca, Vercelli, Italy, and Paul Rohrer, Herrliberg, Switzerland, assignors to Matec Holding AG, Kusnacht, Switzerland

Filed Sep. 22, 1987, Ser. No. 99,525
Claims priority, application Switzerland, Sep. 26, 1986, 73867/86
Int. Cl.[5] B32B *27/00*
U.S. Cl. 428—95 **17 Claims**



1. A noise-reducing structural element, consisting essentially of a first layer being a noise-absorbing and thermally insulating layer selected from a group consisting of thermoformed fiber and a foam which is at least partially open-cell, and a second layer being a sound-insulating layer adjacent thereto and with a surface of one layer adjacent a surface of the other layer, the adjacent surfaces of the two layers being bonded to one another at least at spaced locations, said second layer comprising rigid, impermeable, thermoformed, synthetic, and self-supporting material, and said second layer supporting said first layer.

4,966,800

CONVERTIBLE TEXTILE FIRE BLOCK MATERIAL

Anton Maix, P.O. Box 21306, Ft. Lauderdale, Fla. 33335

Continuation of Ser. No. 757,478, Jul. 22, 1989, Pat. No. 4,898,757. This application Feb. 9, 1989, Ser. No. 309,835
Int. Cl.[5] B32B *3/02*
U.S. Cl. 428—97 **11 Claims**

1. A convertible textile material product having at least a portion of said textile material product convertible by flux of heat into a fire barrier material, comprising:
a textile material means for forming the face of said textile material product in a first normal state, at least a portion of said textile material means convertible by the flux of heat into a fire barrier layer in a second fired state; and
a carrier means connected to said material means, said carrier means for supporting said textile material means in said first normal state for use as a textile and for supporting said textile material means in said second fired state for use as a fire block, said carrier means connected to said textile material means in said first normal state and said second fired stated;
said textile material means is wool.

4,966,801

LIGHTWEIGHT COMPOSITE MATERIAL

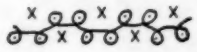
Robert Becker, Leverkusen; Gerd Goldmann, Krefeld; Ulrich von Gizycki, Leverkusen, and Wulf von Bonin, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 25, 1988, Ser. No. 276,670

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1987, 3741539

Int. Cl.[5] B32B *5/12*

U.S. Cl. 428—113 20 Claims



1. A lightweight composite material comprising reinforcing fibers in a thermoplast matrix, the fibers being at least 50 mm in length and being three-dimensionally arranged in the material, and the thermoplast matrix being characterized by the presence of cavities therein.

4,966,802

COMPOSITES MADE OF FIBER REINFORCED RESIN ELEMENTS JOINED BY ADHESIVE

Paul E. Hertzberg, San Diego, Calif., assignor to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 99,315, Sep. 21, 1987, abandoned, which is a division of Ser. No. 732,753, May 10, 1985, Pat. No. 4,786,343. This application May 16, 1989, Ser. No. 355,129

Int. Cl.[5] B64C *1/06, 1/12;* B32B *7/12, 5/12*

U.S. Cl. 428—119 15 Claims

1. A delamination resistant fiber reinforced resin composite comprising:

a fiber reinforced resin composite panel formed of a lay-up of fiber plies and a resin matrix;

at least one elongate fiber reinforced resin composite reinforcing member formed of a lay-up of fiber plies and a resin matrix; and

a high shear strength, high toughness, thermosetting resin adhesive layer consisting essentially of a thermosetting resin located between juxtaposed surfaces of said fiber reinforced resin composite panel and said fiber reinforced composite reinforcing member for bonding said fiber reinforced resin composite panel to said fiber reinforced resin composite reinforcing member, said thermosetting resin having a higher shear strength and being different from the resin used to form said resin matrix of said fiber reinforced resin composite panel and said fiber reinforced resin composite reinforcing member, said thermosetting resin substantially entirely filling the space between said fiber reinforced resin composite panel and said fiber reinforced composite reinforcing member.

4,966,803

POLYMER FILMS PARTIALLY PROVIDED WITH STIFFENED SEGMENTS, PROCESS FOR THE PRODUCTION THEREOF, AND THE USE THEREOF

Pieter B. Pluyter, Sittard, and Hendrikus J. J. Rutten, Maastricht, both of Netherlands, assignors to Stamicarbon, B.V., Geleen, Netherlands

Filed Jul. 25, 1988, Ser. No. 223,594

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724438

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—192 14 Claims

1. A film comprising copolymers of high molecular weight, obtained by casting polymers, dissolved or swollen in solvents, wherein said film contains stiffened segments having a width of at least 0.5 mm, and said polymers have molecular weights greater than 1×10^4 g/mol.

4,966,804

PRINTED MATERIAL IMPARTED WITH IMPROVED WATER-PROOFNESS

Masamitsu Hasegawa; Satoshi Tamura; Isao Sugiyama, and Takashi Wakashima, all of Saitama, Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,944

Claims priority, application Japan, Nov. 30, 1987, 62-301776

Int. Cl.[5] B41M *5/00*

U.S. Cl. 428—203 8 Claims

1. A water-resistant printed material which comprises:

(a) a base sheet material of which at least the surface layer has no or little capacity for absorption of water;

(b) a coating layer on one of the surfaces of the base sheet material made from a coating composition comprising a water-absorptive resinous polymer;

(c) a water-soluble coloring material deposited in dots to form a patterned image in the coating layer of the base sheet material, the dots of the water-soluble coloring material being formed by the ink-jet printing method using an aqueous ink containing the water-soluble coloring material; and

(d) an overcoating layer made from a cured polyisocyanate compound.

4,966,805

HEAT-SHRINKABLE POLYSTYRENE-BASE FOAMED COMPOSITE SHEET

Hiroshi Ezawa; Takayuki Watanabe, both of Yokohama; Hiroaki Tsushima, Kamakura, and Zyuzo Nishiba, Washimiya, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Mar. 20, 1990, Ser. No. 496,011

Claims priority, application Japan, Mar. 28, 1989, 1-73932

Int. Cl.[5] B32B *3/26*

U.S. Cl. 428—212 14 Claims

1. A heat-shrinkable polystyrene-base foamed composite sheet prepared by laminating a heat-shrinkable polystyrene-base foamed sheet and a heat-shrinkable polystyrene-base film by applying a polyurethane-base adhesive between said foamed and said film.

4,966,806

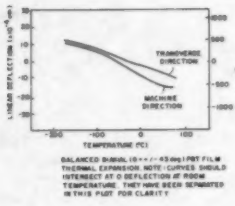
FILM-BASED STRUCTURAL COMPONENTS WITH CONTROLLED COEFFICIENT OF THERMAL EXPANSION

Richard W. Lusignea, Brighton; William S. Stevenson, Concord, and John F. McCoy, III, N. Chelmsford, all of Mass., assignors to Foster Miller, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 942,150, Dec. 16, 1986, Pat. No. 4,871,595. This application Jun. 14, 1988, Ser. No. 206,620

Int. Cl.[5] B23B 9/00

U.S. Cl. 428—220 14 Claims



BALANCED BIAXIAL (0 +/- 45 deg) PET FILM THERMAL EXPANSION. NOTE: CURVES SHOULD INTERSECT AT 0 DEFLECTION AT ROOM TEMPERATURE. THEY HAVE BEEN SEPARATED IN THIS PLOT FOR CLARITY.

1. An article of manufacture comprising a thin, dimensionally stable, high stiffness near zero CTE film based component, comprising a molecularly oriented lyotropic liquid crystalline film.

4,966,807

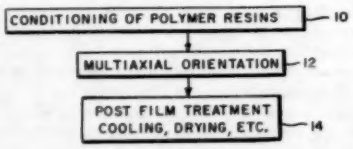
MULTIAXIALLY ORIENTED THERMOTROPIC POLYMER FILMS AND METHOD OF PREPARATION

Andrew C. Harvey, Waltham; Richard W. Lusignea, Brighton, and James L. Racich, Framingham, all of Mass., assignors to Foster Miller, Inc., Waltham, Mass.

Filed Jun. 13, 1988, Ser. No. 206,484

Int. Cl.[5] B32B 9/00

U.S. Cl. 428—220 14 Claims



1. A film having a controllable coefficient of thermal expansion and a thickness of at least about 0.010 mm, prepared from a molecularly ordered thermotopic liquid crystalline polymer, said film having a multiaxial molecular orientation.

4,966,808

MICRO-FIBERS-GENERATING CONJUGATE FIBERS AND WOVEN OR NON-WOVEN FABRIC THEREOF

Michinori Kawano, Kyoto, Japan, assignor to Chisso Corporation, Ohsaka, Japan

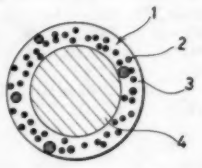
Filed Jan. 23, 1990, Ser. No. 468,860

Claims priority, application Japan, Jan. 27, 1989, 1-18269

Int. Cl.[5] D02G 3/02

U.S. Cl. 428—224 5 Claims

1. Micro-fibers-generating conjugate fibers, wherein at least one conjugate component of said fibers has an island-in-sea structure, said micro-fibers-generating conjugate fibers has a fineness of one denier or more, the other conjugate component of said micro-fibers-generating conjugate fibers has a fineness of 0.5 denier or more, said at least one conjugate component having an island-in-sea structure is exposed on the surface of said micro-fibers-generating conjugate fibers, the sea part of said conjugate component is removable by a solvent treatment,



the island part of said conjugate component after removing the sea part has a fineness of 0.1 denier or less.

4,966,809

WATER-ABSORBING COMPOSITE BODY

Toyoaki Tanaka, Yokohama; Katuzi Ohira, Sagamihara; Akira Nakamura, Chigasaki; Ryosuke Kamei, and Akihiro Hashimoto, both of Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

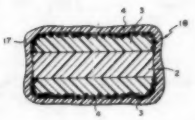
PCT No. PCT/JP87/00208, § 371 Date Dec. 2, 1987, § 102(e) Date Dec. 2, 1987, PCT Pub. No. WO87/05860, PCT Pub. Date Oct. 8, 1987

PCT Filed Apr. 2, 1987, Ser. No. 155,935

Claims priority, application Japan, Apr. 2, 1986, 61-74366; Apr. 7, 1986, 61-79847; Jul. 30, 1986, 61-179221; Jul. 30, 1986, 61-179222; Jul. 30, 1986, 61-179223; Jul. 30, 1986, 61-179224

Int. Cl.[5] B32B 27/14, 5/16; B29D 9/00

U.S. Cl. 428—323 15 Claims



1. A water-absorbing composite body comprising (A) a split yarn obtained by splitting a tape-shaped three-layer laminate composed of a low-melting point synthetic resin layer, a high-melting point synthetic resin layer, and a low-melting point synthetic resin layer, wherein the two low-melting point synthetic resin layers are exposed on the surface of the laminate, and B) a powdery polymeric water-absorber fusion-bonded to the exposed surface of each low-melting point synthetic resin layer.

4,966,810

MELEIC ANHYDRIDE GRAFT COPOLYMERS HAVING LOW YELLOWNESS INDEX AND FILMS CONTAINING THE SAME

Chad A. Strait; Ricky L. Tabor, both of Lake Jackson, and Gerald M. Lancaster, Freeport, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 229,078, Aug. 5, 1988, Pat. No. 4,927,888, which is a continuation-in-part of Ser. No. 905,099, Sep. 5, 1986, Pat. No. 4,762,890. This application Mar. 6, 1990, Ser. No. 489,390

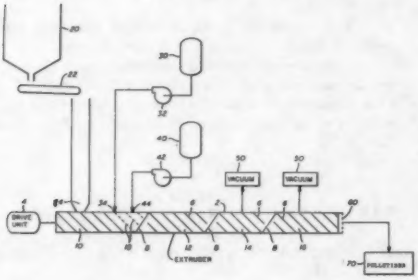
Int. Cl.[5] B32B 27/00

U.S. Cl. 428—335 9 Claims

1. A multilayer film containing at least two layers wherein at least one of said layers comprises a blend of:

(a) between about 1.5 to about 75.0 weight percent graft copolymer having a yellowness index as measured accord-

ing to ASTM-D-1925 of less than 10.0 wherein said graft copolymer comprises the reaction product of maleic anhydride and backbone polymer and further wherein said



graft copolymer comprises between 0.5 and 2.0 weight percent of maleic anhydride; and

(b) between about 25.0 to about 98.5 weight percent polyolefin.

4,966,811

INNER SUPPORT MATRIX FOR MOULDED BODIES

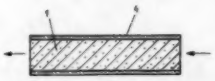
Hans A. Haerle, Bopfingen, Fed. Rep. of Germany, assignor to Schaebische Huettenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Aug. 23, 1989, Ser. No. 397,557

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3828706

Int. Cl.[5] D02G *3/00*

U.S. Cl. 428—375 **18 Claims**



1. A molded body comprising: a non-planar inner support matrix body, a plastic envelope surrounding at least partially said support matrix wherein said support matrix body is formed at least partially from metal wire elements.

4,966,812

SOL-GEL ANTIREFLECTIVE COATING ON PLASTICS

Carol S. Ashley, and Scott T. Reed, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Division of Ser. No. 148,458, Jan. 26, 1988, abandoned. This application Jun. 1, 1989, Ser. No. 359,458

Int. Cl.[5] B32B *27/36*

U.S. Cl. 428—412 **14 Claims**

1. A method to form an antireflective film, comprising:

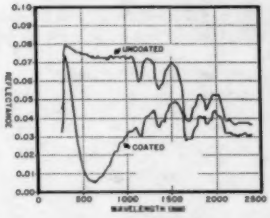
applying to a surface of a substrate a sol-gel antireflective surface coating solution, prepared by a method comprising the steps of:

(a) subjecting a solution of a silicon alkoxide, a metal alkoxide, or a mixture thereof to hydrolyzation and condensation in a reaction system containing water and a catalyst in an alcohol solution;

(b) aging said system to form a sol-gel hydrolyzation-condensation polymeric reaction product;

(c) reliquifying the gel of said sol-gel reaction product by breaking the polymer-polymer bonds of said gel;

(d) diluting said reliquified sol-gel reaction product to produce said sol-gel antireflective surface coating solution;



air drying said coated substrate; and

further drying said coated substrate under a heat lamp.

4,966,813

REFLECTION-PREVENTIVE PELLICLE FILM

Tokinori Agou; Hitomi Matsuzaki; Masahide Tanaka; Takamasa Tsumoto; Masaaki Kawasaki; Takami Nishikawa, and Shuji Minami, all of Yamaguchi, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 216,955

Claims priority, application Japan, Jul. 10, 1987, 62-171118; Oct. 13, 1987, 62-258100; Jan. 27, 1988, 63-16319; Jan. 27, 1988, 63-16320; Jan. 27, 1988, 63-16321; Feb. 29, 1988, 63-47091

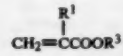
Int. Cl.[5] B32B *27/00*; G02B *1/10*

U.S. Cl. 428—421 **13 Claims**

1. A reflection-preventive pellicle film comprising a transparent film of a cellulose derivative and a reflection-preventive layer of a polyfluoro(meth)acrylate formed on one or both of the surfaces of the transparent film, wherein said polyfluoro(-meth)acrylate is selected from the group consisting of:

(1) a polyfluoroacrylate which is a copolymer of (A) trifluoroethyl acrylate and (B) perfluorooctylethyl acrylate having an (A)/(B) molar ratio of from 55/45 to 75/25 and a reduced specific viscosity lower than 1 dl/g, a measured in a m-xylene hexafluoride solution having a concentration of 0.1 g/dl at 30° C.,

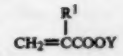
(2) a polyfluoro(meth)acrylate which is a copolymer of at least one monomer represented by the following general formula:



(II)

wherein R^1 represents a hydrogen atom or a methyl group, and R^3 stands for fluoroalkyl group,

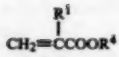
and at least one monomer represented by the following general formula:



(III)

wherein R^1 is as defined above, and Y stands for a hydrocarbon group containing an intermediate etheric oxygen atom or a hydrocarbon group containing an intermediate etheric oxygen atom, to which a fluoroalkyl group is bonded,

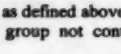
(3) a polyfluoro(meth)acrylate which is a copolymer of at least one monomer represented by the following general formula:



(IV)

wherein R^1 is as defined above, and R^4 stands for a linear fluoroalkyl group not containing an etheric oxygen atom,

and at least one monomer represented by the following general formula:



(V)

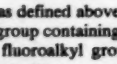
wherein R^1 is as defined above, and R^5 stands for a linear fluoroalkyl group containing an etheric oxygen atom or a branched fluoroalkyl group which may contain an etheric oxygen atom,

and (4) a polyfluoro(meth)acrylate which is a copolym :r by the following general formula:

(I)

wherein R^1 is as defined above, and R^2 represents a fluoroalkyl group which may contain an intermediate etheric oxygen atom,

and at least one monomer represented by the following general formula:



(VI)

wherein R^1 is as defined above, and R^6 stands for an alkyl group.

4,966,814

ELECTROLESS PLATING-SUSCEPTIVE, FIRE RETARDANT POLYPHENYLENE ETHER RESIN

Jurou Ohzeki, Kimitsu, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 5, 1989, Ser. No. 403,262

Claims priority, application Japan, Sep. 7, 1988, 63-222518; Sep. 7, 1988, 63-222519

Int. Cl.[5] B32B *15/04, 15/08, 27/38*

U.S. Cl. 428—457 **10 Claims**

1. An electroless plating-susceptive, fire retardant polyphenylene ether resin composition comprising:

(A) 10 to 60% by weight, based on the total weight of components (A), (B) and (C), of a polyphenylene ether resin;

(B) 10 to 90% by weight, based on the total weight of components (A), (B) and (C), of a rubber-modified resin comprising (D) a grafted rubber phase comprising an elastomeric rubber having grafted thereto a graft component composed of acrylonitrile units and vinyl aromatic compound units and (β) a resin phase of a polymer or polymer mixture comprising acrylonitrile units and vinyl aromatic compound units,

said grafted rubber phase (α) having a grafting degree of from 40 to 300% as defined by the ratio (%) of the weight of said graft component grafted to the elastomeric rubber to the weight of said elastomeric rubber,

the content of the acrylonitrile units in said graft component and the content of the acrylonitrile units in resin phase (β) being from 10 to 30% by weight, based on the weight of said graft component and from 3 to 9% by weight, based on the weight of resin phase (β), respectively,

the amount of all the acrylonitrile units in rubber-modified resin (B) being from 1 to 7% by weight, based on the total weight of components (A), (B) and (C),

the amount of said elastomeric rubber being from 5 to 20% by weight, based on the total weight of components (A), (B) and (C);

(C) 0 to 80% by weight, based on the total weight of components (A), (B) and (C), of a polystyrene resin;

(D) 1 to 4 parts by weight of red phosphorus per 100 parts by weight of the total of components (A), (B) and (C); and

(E) 1 to 12 parts by weight of a phosphoric acid ester per 100 parts by weight of the total of components (A), (B) and (C).

4,966,815

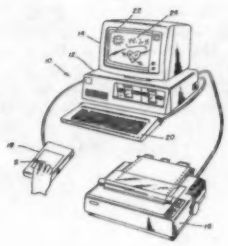
TRANSFER SHEET FOR APPLYING A CREATIVE DESIGN TO A FABRIC

Donald S. Hare, New York, N.Y., assignor to Foto-Wear, Inc., Brunswick, N.J.

Continuation of Ser. No. 177,699, Mar. 22, 1988, abandoned, which is a division of Ser. No. 819,605, Jan. 17, 1986, Pat. No. 4,773,953, which is a continuation-in-part of Ser. No. 703,529, Feb. 20, 1985, abandoned. This application Nov. 3, 1989, Ser. No. 432,306

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—497 **1 Claim**



1. A transfer sheet consisting of

(a) a substrate;

(b) a first coating on said substrate of material transferable from said substrate to a receptor surface by the application of heat or pressure thereto; and

(c) a second coating on said first coating, said second coating consisting essentially of Singapore Dammar Resin.

4,966,816

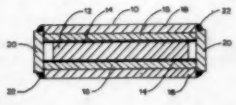
PACK ASSEMBLY FOR HOT ROLLING

Tommie L. Wardlaw, Henderson, and Paul J. Bania, Boulder City, both of Nev., assignors to Titanium Metals Corporation of America (TIMET), Pittsburgh, Pa.

Filed Jun. 7, 1989, Ser. No. 362,511

Int. Cl.[5] B22F *3/00*

U.S. Cl. 428—552 **6 Claims**



1. A pack assembly for use in hot rolling a material sensitive to heat loss, such as gamma titanium aluminide, said pack assembly comprising a pair of opposed, deformable metal cover plates adjacent opposite outer major surfaces of at least one flat product of said material positioned between said cover

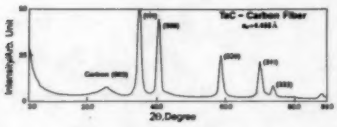
plates, and a continuous thermal barrier positioned between each of said outer major surfaces and each of said cover plates.

4,966,817

TRANSITION-METAL-CARBON COMPOSITES AND METHODS FOR MAKING

Mortimer M. Labes, Philadelphia, Pa., and J. H. Chen, Rochester, N.Y., assignors to Temple University, Philadelphia, Pa.

Filed Sep. 23, 1987, Ser. No. 99,827
Int. Cl.[5] B22F *3/00*; C01B *21/06*
U.S. Cl. 428—552 **42 Claims**



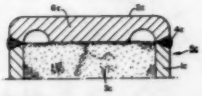
1. Method for making a carbon-transition metal composite comprising heating polycyanogen in the presence of a transition metal or transition metal salt in an oxygen-free environment to at least 400° C. and holding it at that temperature for a time sufficient to form a pyropolymer having a carbon to nitrogen ratio of at least 1.2 and to form a composite containing pyrolyzed polycyanogen and a transition metal.

4,966,818

METHOD TO CONSOLIDATE A METAL POWDER BODY AND FORGING PRODUCED BY THE METHOD

Bertil Johansson, Molkom, and Per Hasselström, Söderfors, both of Sweden, assignors to Uddeholm Tooling Aktiebolag, Sweden

PCT No. PCT/SE87/00429, § 371 Date Apr. 11, 1989, § 102(e) Date Apr. 11, 1989, PCT Pub. No. WO88/03449, PCT Pub. Date May 19, 1988
PCT Filed Sep. 24, 1987, Ser. No. 346,974
Claims priority, application Sweden, Nov. 14, 1986, 8604876
Int. Cl.[5] B22F *7/04*
U.S. Cl. 482—558 **10 Claims**



1. A method for the consolidation of a metal powder body to a completely dense body comprising the steps of:

(a) charging a plate capsule, consisting of a cylindrical wall and in one end thereof an end plate, with metal powder so that the powder at least essentially completely fills the capsule;

(b) closing the opposite end of said capsule by a second end plate;

(c) heating the capsule and its contents to a forging temperature suitable for the metal; and

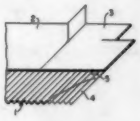
(d) forging to consolidate the powder to a completely dense body while substantially preventing the end plates from bulging during forging and thereby losing contact with the powder before the powder has been compacted to at least near complete density by stiffening the central portions of the end plates by at least one stiffening member wherein said stiffening member is welded to the inside of an end plate along a substantial length thereof to stiffen said end plate, and wherein said stiffening member projects into the powder body to a depth sufficient to anchor the end plate in the powder body.

4,966,819

COVERING FRAME FOR WINDOWS, DOORS, AND THE LIKE

Wolfgang Schatz, Weilheim, and Helmut Schneider, Grevenbroich, both of Fed. Rep. of Germany, assignors to Vereinigte Aluminum-Werke AG, Bonn and Braun GMBH & Co., Weilheim, both of, Fed. Rep. of Germany

Filed Jan. 11, 1989, Ser. No. 296,190
Claims priority, application European Pat. Off., Jan. 13, 1988, 88 100 353.7
Int. Cl.[5] E06B *1/56*
U.S. Cl. 428—603 **23 Claims**



1. A covering for an exterior surface of a structure, comprising:

means for sealing a transition on the exterior surface of the structure, said sealing means including a lead layer;

an aluminum layer covering at least a portion of said lead layer; and

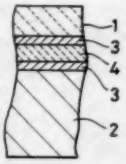
a flashing connected to said lead layer.

4,966,820

CERAMICS-COATED HEAT RESISTING ALLOY MEMBER

Yoshitaka Kojima; Akira Mebata, both of Ibaraki; Akihiko Chiba, Iwate; Ryoichiro Ohoshima, Ibaraki; Norio Watanabe, Tokyo, and Yukiyoshi Hara, Saitama, all of Japan, assignors to Hitachi, Ltd. and The Tokyo Electric Power Company, both of Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,649
Claims priority, application Japan, May 6, 1988, 63-109025
Int. Cl.[5] B32B *15/04*
U.S. Cl. 428—622 **13 Claims**



13. A ceramic-coated heat resisting alloy member comprising:

a heat resisting alloy base metal;

a second alloy layer which comprises an alloy material superior to said base metal with respect to its resistance to high temperature oxidation and which has been deposited on an external surface of said base metal by a spray coating method; a mixture layer which comprises a ceramic material and a metal in a ratio by weight of 2:1 and which has been deposited on a surface of said second alloy layer by a spray coating method;

a first alloy layer which comprises said alloy material depos-

ited on a surface of said mixture layer by a spray coating method; and

a ceramic coating layer which is a ceramic material deposited on a surface of said first alloy layer by a spray coating method; wherein

said heat resisting alloy base metal comprises at least one of Ni and Co as a main component, 7 to 20 wt % of Cr and 1 to 8 wt % of at least one of Ti and Al, and at least one of Ta, Nb, W and Mo in a total content of 10 wt % or less;

said alloy material comprises at least one of Ni and Co, 13 to 40 wt % of Cr, 5 to 20 wt % of Al, and 0.1 to 3 wt % of at least one of Hf, Ta, Y, Si and Zr;

said ceramic material comprises ZrO_2 as a main component, and at least one of 4 to 20 wt % of Y_2O_3, 4 to 8 wt % of CaO and 4 to 24 wt % of MgO;

the thickness of said second alloy layer is 0.03 to 0.5 mm;

the thickness of said mixture layer is 0.03 to 0.5 mm;

the thickness of said first alloy layer is 0.03 to 0.5 mm;

the thickness of said ceramic coating layer is 0.05 to 1.0 mm; and

said spray coating method is a plasma spray coating method.

4,966,821

PERPENDICULAR MAGNETIC RECORDING MEDIUM

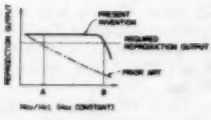
Ikue Kawashima; Futoyoshi Koh; Masafumi Kumano, and Shinei Ryu, all of Sendai, Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics Co., Ltd., Miyagi, both of, Japan

Continuation-in-part of Ser. No. 73,461, Jul. 15, 1987, abandoned. This application Jun. 27, 1989, Ser. No. 372,307

Claims priority, application Japan, Jul. 17, 1986, 61-168915; Mar. 26, 1987, 62-73762

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—694 **2 Claims**



1. A perpendicular magnetic recording medium comprising:

a substrate;

a soft magnetic layer formed on said substrate;

a lower recording layer having a coercive force of Hcl formed on said soft magnetic layer; and

an upper recording layer having a coercive force of Hcu, with the coercive ratio of Hcu/Hcl being in the range of 1.4 to 3.3.

4,966,822

BATTERY ASSEMBLY

Lowell E. Johnston, 11515 Welebir St., Loma Linda, Calif. 92354

Continuation-in-part of Ser. No. 304,953, Feb. 1, 1989. This application May 1, 1989, Ser. No. 345,681

Int. Cl.[5] H01M *2/30*

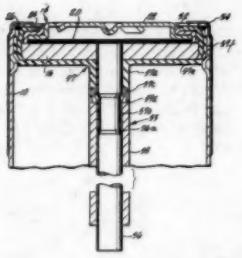
U.S. Cl. 429—62 **21 Claims**

1. A battery terminal comprising

a post having a neck of reduced cross section near a first end;

a sleeve snug about said post and extending over a substantial portion of said post, said sleeve also extending over a portion of said neck;

a cylindrical seal about said first end of said post and extending over said neck, said sleeve overlapping said seal over



said neck with said seal in compression between said neck and said sleeve.

4,966,823

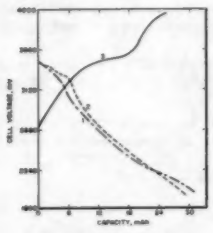
ORGANIC CATHODE FOR A SECONDARY BATTERY

Ratnakumar V. Bugga, Arcadia; Salvador DiStefano, Alhambra; Roger M. Williams, Azusa, and Clyde P. Bankston, Studio City, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 7, 1989, Ser. No. 404,288

Int. Cl.[5] H07M *10/39, 4/60*

U.S. Cl. 429—104 **19 Claims**



1. A battery system comprising in combination:

a first body of liquid meal anode comprising a Group I metal;

a record body of liquid cathode comprising a combination of a Group I metal salt and a Group III metal salt molten at the temperature of operation of the battery containing a minor amount of an organic carbonitrile depolarizer containing at least one adjacent ethylenic bond.

4,966,824

LIQUID TONER COMPOSITION CONTAINING TWO DIFFERENT CHARGE DIRECTORS

Yehuda Niv, Rehovot, Israel; Benzion Landa, Edmonton, Canada; Moshe Levanon, Rehovot, Israel; Israel Grossinger, and Yossi Adam, both of Rehovot, Israel, assignors to Spectrum Sciences, Rotterdam, Netherlands

Filed Jun. 6, 1988, Ser. No. 202,677

Int. Cl.[5] G03G *9/12*

U.S. Cl. 430—115 **2 Claims**

1. A liquid toner composition for use in development of a latent electrostatic imaging process, said composition comprising:

(a) an insulating non-polar liquid having admixed therewith first and second different types of pigmented particles,

each type carrying a charge of a polarity opposite to the polarity of the other type; and

(b) two different charge directors effective to promote charging of said first and second types of pigmented particles to opposite polarities.

4,966,825

METHOD FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER

Nobuo Suzuki; Yutaka Sakassi, and Hideo Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 240,907, Sep. 7, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 474,688

Claims priority, application Japan, Sep. 7, 1987, 62-223584; Sep. 7, 1987, 62-223585

Int. Cl.[5] G03G 5/00

U.S. Cl. 430—137 9 Claims

1. A method for producing an electrophotographic liquid developer comprising:

(A) a mixing step of stirring a mixture comprising a coloring agent, an ethylenic copolymer, and an electrically insulating liquid having an affinity with the copolymer, at a temperature higher than the softening point of the copolymer;

(B) a dispersing step of dispersing the mixture in an electrically insulating liquid, after cooling to a temperature below the softening point of the copolymer; and

(C) a diluting step of diluting the dispersion with an electrically insulating liquid to provide a liquid developer for use; wherein step (A) and/or step (B) is performed in the presence of a basic nitrogen-containing polymer.

4,966,826

DIFFUSION TRANSFER PHOTOGRAPHIC FILM UNITS

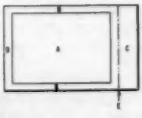
Yukio Shinagawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 3, 1989, Ser. No. 305,673

Claims priority, application Japan, Feb. 3, 1988, 63-23493

Int. Cl.[5] G03C 1/40, 5/54

U.S. Cl. 430—262 9 Claims



1. A peel-apart type diffusion transfer unit comprising at least an image receiving layer and a peeling layer on a support, wherein the peeling layer essentially consists of (A) a layer containing a copolymer which contains repeating units (monomer units) derived from an ethylenic unsaturated carboxylic acid or a salt thereof, and (B) a layer which contains a cellulose ester.

4,966,827

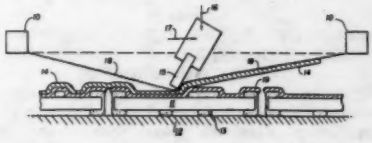
POLYMER PRINTING

Donald F. Sullivan, King of Prussia, Pa., assignor to Atochem North America, Inc., Philadelphia, Pa.

Continuation of Ser. No. 672,500, Nov. 19, 1984, Pat. No. 4,732,829, which is a continuation-in-part of Ser. No. 364,309, Apr. 1, 1982, Pat. No. 4,506,004. This application Nov. 24, 1987, Ser. No. 124,741

Int. Cl.[5] G03C 1/94

U.S. Cl. 430—270 50 Claims



1. A process for producing a solder mask coating on a printed wiring board having an insulating surface and electrical conductors in predetermined areas comprising the steps of coating the printed wiring board with a layer of curable, 100 percent solids liquid of predetermined thickness to overly the electrical conductors and insulating surface free from air pockets between the layer and the board surface, thereafter overlaminating a layer of dry film solder mask of predetermined thickness as an outer surface layer onto the printed wiring board surface, exposing to harden the dry film solder mask and liquid in selected positions to form said solder mask, washing out unhardened material, and curing to form the solder coating.

4,966,828

CARBONYLMETHYLENE-HETEROCYCLIC COMPOUNDS CONTAINING TRIHALOGENOMETHYL GROUPS, PROCESS FOR THEIR PREPARATION, AND LIGHT-SENSITIVE MIXTURE CONTAINING THE COMPOUNDS

Reinhard Doenges, Bad Soden; Hans Ruckert, Wiesbaden-Naurod; Ulrich Geissler, Frankfurt am Main, and Hartmut Steppan, Wiesbaden-Dotzheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

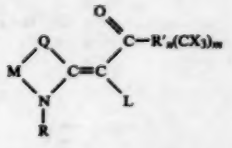
Filed Sep. 13, 1984, Ser. No. 651,116

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1983, 3333450

Int. Cl.[5] G03C 1/675; G03F 7/028, 7/038; C07D 290/04

U.S. Cl. 430—281 13 Claims

1. A compound of the formula I



wherein

L represents a hydrogen atom or a substituent of the formula $CO—R^1(CX_3)_m$,

M represents a substituted or unsubstituted alkylene radical or alkenylene radical or a 1,2-arylene radical,

Q represents a sulfur, selenium or oxygen atom, a dialkylmethylene group, an alken-1,2-ylene radical, a 1,2-phenylene radical or an N-R group, whereby M+Q together form 3 or 4 ring members,

R represents an alkyl, aralkyl or alkoxyalkyl radical,

R^1 is a carbocyclic aromatic or heterocyclic aromatic group, and

X is a chlorine, bromine or iodine atom, and m=1 or 2.

5. A light-sensitive mixture, comprising a compound (a) which includes a light-sensitive, heterocyclic organic compound as claimed in claim 1, and has at least one trihalogenomethyl substituent; and a compound (b) capable of reacting with the photoreaction product of said compound (a) to form a product having a light absorption or solubility in a developer different from that of compound (b).

4,966,829

TONER FOR DEVELOPING ELECTROSTATIC IMAGES, BINDER THEREFOR AND PROCESS FOR PRODUCTION THEREOF

Satoshi Yasuda, Matsudo; Kiichiro Sakashita, Tokyo; Yasuo Mitsuhashi, Yokohama; Seiichi Takagi, Yokohama; Shuichi Aita, Toride; Yoshinobu Nagai, Kohbe, and Toshiaki Nakahara, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 94,389, Sep. 8, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,599

Claims priority, application Japan, Sep. 8, 1986, 61-212179; Mar. 12, 1987, 62-57358; Mar. 12, 1987, 62-57359

Int. Cl.[5] G03G *11/00*

U.S. Cl. 430—109 **25 Claims**

1. A toner for developing electrostatic latent images comprising: a colorant or magnetic powder and a binder resin comprising a vinyl-type polymer, a vinyl-type copolymer or a mixture thereof, said binder resin having (i) 10 to 60 wt. % of chloroform or THF (tetrahydrofuran)-insoluble component and (ii) a THF (tetrahydrofuran)-soluble component, the THF (tetrahydrofuran)-soluble component having a molecular weight distribution in a GPC (gel permeation chromatography) chromatogram thereof which provides at least one peak in the molecular weight range of 1000 to 25000 and at least one peak or shoulder in the molecular weight range of 2,000 to 150,000.

4,966,830

PHOTOPOLYMERIZABLE COMPOSITION

Hideki Nagasaka, Yamato, and Katsuko Ohta, Yokohama, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jul. 12, 1988, Ser. No. 217,981

Claims priority, application Japan, Jul. 21, 1987, 62-181317; Mar. 2, 1988, 63-049017

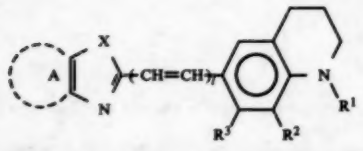
Int. Cl.[5] G03C *1/72, 1/68*

U.S. Cl. 430—281 **10 Claims**

1. A photopolymerizable composition comprising an addition polymerizable compound having at least one ethylenically unsaturated double bond and a photopolymerization initiator system, wherein the photopolymerization initiator system comprises:

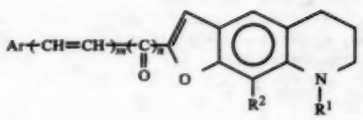
(a) at least one sensitizer selected from the group consisting of a compound of the formula:

(I)



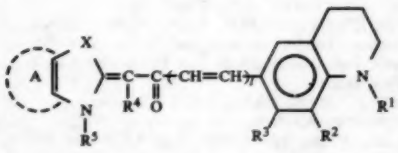
wherein ring A is a substituted or unsubstituted benzene or naphthalene ring, X is a bivalent atom or a bivalent group, R^1 is an alkyl group, each of R^2 and R^3 is hydrogen, an alkyl group, an alkoxy group or an alkylthio group, or R^1 and R^2 bond to each other, and l is 0, 1 or 2, a compound of the formula:

(II)

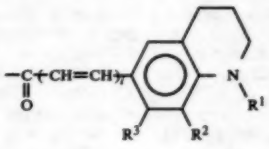


wherein R^1 and R^2 are as defined above, Ar is an aromatic group, and each of n and m is 0 or 1, a compound of the formula:

(III)

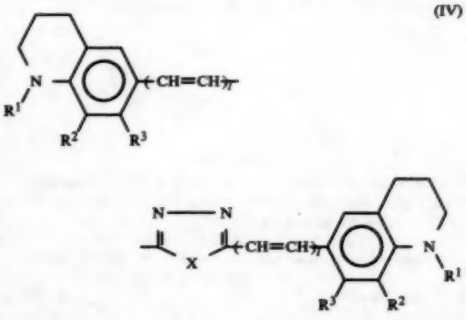


wherein R^1, R^2, R^3, ring A, X and l are as defined above, R^4 is hydrogen, an acetyl group or



wherein R^1, R^2, R^3 and l are as defined above, and R^5 is an alkyl group, and a compound of the formula:

(IV)



wherein R^1, R^2, R^3, X and l are as defined above, and

(b) at least one activator capable of generating active radicals when irradiated in the presence of said sensitizer.

4,966,831

LENS ARRAYS FOR LIGHT SENSITIVE DEVICES

Madhav Mehra, and Armin K. Weiss, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

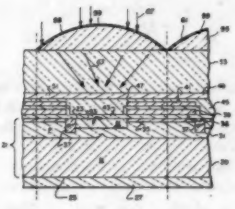
Filed Apr. 20, 1989, Ser. No. 341,083

Int. Cl.[5] G03C *5/00*

U.S. Cl. 430—321 **5 Claims**

1. In a method of forming an integral lens array on a light sensitive device defining a plurality of sensing elements, the lens array having a separate lens for each image sensing element, said lenses being substantially transparent over the wavelength range from 400 nm to 1000 nm comprising the steps of:

(a) providing a spacer and planarization layer on the device over each sensing element;
(b) applying a layer of photoresist material;
(c) patterning and flowing the photoresist material to form a



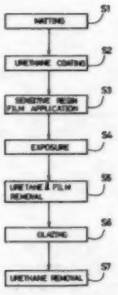
desired lens array on the spacer and planarization layer by applying heat; and
(d) conformally coating the so formed lenses with a layer having a thickness of between 1000 and 3000 Å of transparent dielectric silicon dioxide.

4,966,832

METHOD OF TREATING INNER MOLD SURFACE

Masaaki Shigesada, Hatano, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 11, 1989, Ser. No. 350,195
Claims priority, application Japan, May 13, 1988, 63-116419
Int. Cl.[5] G03C 5/00
U.S. Cl. 430—323 **9 Claims**



1. A method of treating an inner surface of a mold, comprising the steps of:
(a) forming a pattern including ridge portions and furrow portions on an inner surface of a mold by etching;
(b) matting the entire inner surface of the mold;
(c) coating a resin layer on the matted surface;
(d) forming a photosensitive film on the coated resin layer;
(e) exposing only the photosensitive film formed on the ridge portions of the pattern to light by use of a pattern film formed with the same pattern as that formed on the inner surface of the mold;
(f) removing the photosensitive film and the resin layer from the non-exposed furrow portions by a solvent to mask only the ridge portions by the photosensitive film and the resin layer;
(g) glazing only the non-masked furrow portions; and
(h) removing the photosensitive film and the resin layer from the ridge portions to obtain a mold formed with a pattern such that the ridge portions are matted but the furrow portions are glazed.

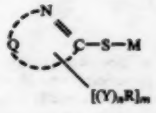
4,966,833

METHOD FOR THE FORMATION OF DIRECT POSITIVE COLOR IMAGES

Noriyuki Inoue, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

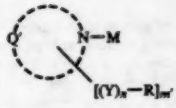
Filed Oct. 5, 1988, Ser. No. 253,471
Claims priority, application Japan, Oct. 5, 1987, 62-251379
Int. Cl.[5] G03C 5/24, 7/00, 1/485
U.S. Cl. 430—378 **6 Claims**

1. A method for the formation of direct positive color images wherein, after image-wise exposure of a direct positive color photosensitive material which comprises at least one internal latent image type silver halide emulsion layer which has not been pre-fogged and color image forming couplers on a support, the material is subjected to development after and/or during a fogging process, the development process being carried out using a development bath which contains at least one N-hydroxyalkyl substituted p-phenylenediamine derivative in the presence of at least one compound of general formula and/or as indicated below:



(I)

wherein
Q represents the group of atoms required to form a five- or six-membered heterocyclic ring, which heterocyclic ring may be condensed with a carbon aromatic ring or a heterocyclic aromatic ring,
Y represents a divalent linking group consisting of at least one atom selected from the group consisting of carbon atom, nitrogen atom, oxygen atom, sulfur atom, and R represents an organic group which includes at least one thioether group, amino group, ammonium group, ether group or hetrocyclic group, n represents 0 or 1, m represents 0, 1 or 2, M represents a hydrogen atom, alkali metal atom, ammonium group or a group which is cleaved under alkaline conditions;



(II)

wherein
Q' represents the group of atoms required to form a five or six membered heterocyclic ring which can form imino silver, Y, R, n and M are the same as those in general formula, and m' represents 1 or 2.

4,966,834

METHOD FOR PROCESSING A SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Takatoshi Ishikawa, and Shinji Ueda, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 1, 1988, Ser. No. 239,579
Claims priority, application Japan, Sep. 3, 1987, 62-219176; Sep. 3, 1987, 62-220892
Int. Cl.[5] G03C 7/30, 7/42
U.S. Cl. 430—393 **14 Claims**

1. A method for processing a silver halide color photographic material comprising the steps of:
(a) developing an imagewise exposed silver halide color photographic material with a color developing solution substantially free from sulfite ions; and
(b) immediately contacting the developed silver halide color photographic material with a bleach-fixing solution con-

taining at least one of (i) from 1×10^{-2} mol to 2 mol of bromide ions and (ii) from 5×10^{-4} mol to 5×10^{-2} mol of iodide ions per liter of said solution.

4,966,835

METHOD FOR PROCESSING A SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Tetunori Matsuhita; Morio Yagihara, and Kei Sakanoue, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 12, 1988, Ser. No. 231,557
Claims priority, application Japan, Aug. 13, 1987, 62-202367
Int. Cl.[5] G03C *7/42*
U.S. Cl. 430—393 **11 Claims**

1. A method for processing a silver halide color photographic material comprising a support having thereon at least one of a silver halide emulsion layer comprising silver iodobromide containing from 2 to 25 mol % of silver iodide and other hydrophilic colloid layer, wherein the silver halide emulsion layer of other hydrophilic colloid layer contains at least one compound represented by formula (I):

$$A—B \qquad (I)$$

wherein A represents a blocking group capable of being cleaved from B during processing and B represents a bleach accelerating agent containing at least one hetero atom linked to A through the hetero atom, wherein said method comprises at least one color developing step and desilvering step comprising a bleach-fixing treatment, the time for the desilvering step being from 30 seconds to 3 minutes.

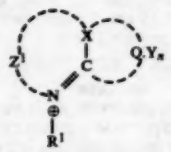
4,966,836

DIRECT POSITIVE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Noriyuki Inoue; Shigeo Hirano; Tetsuo Kojima, and Mitsuru Yamamoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 2, 1988, Ser. No. 278,919
Claims priority, application Japan, Dec. 2, 1987, 62-304995
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.
Int. Cl.[5] G03C *1/485*
U.S. Cl. 430—598 **19 Claims**

1. A direct positive photographic light-sensitive material comprising a support having thereon at least one internal latent image type silver halide emulsion layer not having been previously fogged, wherein the photographic light-sensitive material contains at least one nucleating agent represented by the formula (N-I) and at least one nucleating accelerating agent selected from compounds represented by the formulae (A-I) and (A-II):

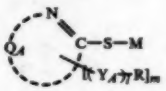


(N-I)

wherein Z^1 represents a non-metallic atomic group necessary to form a 5-membered or 6-membered heterocyclic ring to which an aromatic ring or a heterocyclic ring may further be condensed; R^1 represents an aliphatic group; X represents

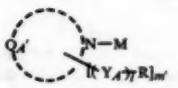
$$=\overset{|}{C}- \quad \text{or} \quad -\overset{|}{N}-;$$

Q represents a non-metallic atomic group necessary to form a 4-membered to 12-membered nonaromatic hydrocarbon ring or nonaromatic heterocyclic ring; at least one of R^1, a substituent for Z^1 and a substituent for Q includes an alkynyl group; Y represents a counter ion necessary for charge balance; and n represents a number necessary to balance a charge



(A-I)

wherein Q_A represents an atomic group necessary to form a 5-membered or 6-membered heterocyclic ring to which a carbocyclic aromatic ring or a heterocyclic aromatic ring may further be condensed; Y_A represents a divalent linkage group comprising an atom or atomic group containing at least one of a hydrogen atom, a carbon atom, a nitrogen atom, an oxygen atom, and a sulfur atom; R represents an organic group containing at least one of a thioether group, an amino group, an ammonium group, an ether group, or a heterocyclic group; l represents 0 or 1; m represents 0, 1 or 2; and M represents a hydrogen atom, an alkali metal atom, an ammonium group or a group capable of being cleaved under an alkaline condition,



(A-II)

wherein Q_A' represents an atomic group necessary to form a 5-membered or 6-membered heterocyclic ring which is capable of forming imino silver; Y_A, R, l and M each has the same meaning as defined in the general formula (A-I) above; and m' represents 1 or 2.

4,966,837

METHODS AND COMPOSITIONS FOR THE DETECTION OF FAMILIAL HYPERCHOLESTEROLEMIA

Michael S. Brown; Joseph L. Goldstein, and David W. Russell, all of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Continuation-in-part of Ser. No. 687,087, Dec. 28, 1984. This application Oct. 30, 1986, Ser. No. 925,702
The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.
Int. Cl.[5] C12Q *1/68;* C12P *19/34;* C12N *15/00;* G01N *33/566*
U.S. Cl. 435—6 **26 Claims**

1. A method for diagnosing a mutation in the LDL receptor gene of an individual comprising the steps of:

(a) fragmenting DNA from cells of the individual;

(b) separating the DNA fragments into patterns according to their physicochemical properties

(c) identifying the pattern of DNA fragments which correspond to the LDL receptor gene; and

(d) diagnosing the mutation by identifying an alteration in the pattern of LDL receptor gene fragments of the individual relative to a pattern of normal LDL receptor gene fragments which have been fragmented in the same fashion.

4,966,838

PROCESS FOR THE IMMUNOLOGICAL QUANTITATIVE DETERMINATION OF T3 AND/OR T4 THYROID HORMONES, USING THYROGLOBULIN

Bernard Ferrua, Nice, and Claude Moulin, Bagnols sur Ceze, both of France, assignors to Compagnie Oris Industrie S.A., Paris, France

Filed May 11, 1987, Ser. No. 48,060
Claims priority, application France, May 12, 1986, 86 06763
Int. Cl.[5] G01N *33/53*
U.S. Cl. 435—7 24 Claims

1. A process for the immunological quantitative determination of T_4 thyroxine, T_3 triiodothyronine or mixtures thereof in free form in a sample comprising the steps of contacting the sample with predetermined quantities of thyroglobulin and anti-T_4, anti-T_3, or mixtures thereof so as to place any T_3, T_4, or mixtures thereof in the sample into competition with the thyroglobulin for sites on the anti-T_4, anti-T_3, or mixtures thereof, and then determining the amount of thyroglobulin fixed or not fixed to the anti-T_4, anti-T_3, or mixtures thereof.

4,966,839

PROCESS FOR THE DETERMINATION OF AN IMMUNOLOGICALLY BINDABLE ANALYTE

Klaus P. Kaspar, Asuncion, Paraguay, assignor to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 926,641, Nov. 3, 1986, abandoned. This application Feb. 28, 1989, Ser. No. 317,111
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539215
Int. Cl.[5] G01N *33/53, 33/557, 33/543, 33/542*
U.S. Cl. 435—7 8 Claims

1. Process for determining if the Hook effect occurs in an analyste containing liquid sample, comprising incubating an analyte containing sample with a labeled first receptor which binds to said analyte and a second, solid phase bound receptor which is not cross reactive with said first receptor and which binds to complex containing said first receptor and analyte, separating liquid phase from solid phase, measuring label bound to said solid phase at a first time after said liquid phase is separated therefrom, and at a further time after the first measurement the back dissociation velocity of said labeled first receptor is determined, and relating said back dissociation value for said sample to a control back dissociation value, wherein a decrease in back dissociation value for said sample as compared to said control is an indication of the occurrence of the Hook Effect.

4,966,840

STABLE HIGH COPY NUMBER PLASMIDS

David H. Gelfand, Oakland, Calif., assignor to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 911,796, Sep. 26, 1986, abandoned, which is a division of Ser. No. 467,369, Feb. 17, 1983, Pat. No. 4,631,257, which is a continuation of Ser. No. 239,165, Feb. 27, 1981, abandoned, which is a continuation-in-part of Ser. No. 972,705, Dec. 26, 1978, abandoned. This application Jun. 14, 1989, Ser. No. 366,318
The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.
Int. Cl.[5] C12P *21/00*; C12N *15/00, 1/20*
U.S. Cl. 435—69.1 3 Claims

1. A method for increasing the production of protein by heterologous DNA in plasmid cloning vectors, comprising, selecting mutants of the plasmid having altered repressor genes leading to high copy number replication, inserting the heterologous DNA into the cloning vectors under the control of a promoter, and disabling readthrough transcription from the promoter into the primer strand gene of the plasmid cloning vector by inserting the heterologous DNA into said cloning vectors in an orientation such that said readthrough transcription is away from said replication primer strand gene or by placing a transcriptional stop signal sequence interposed between said heterologous DNA and said replication primer strand gene.

4,966,841

ENHANCED VECTOR PRODUCTION AND EXPRESSION OF RECOMBINANT DNA PRODUCTS

Donald E. Riley, Seattle, Wash., assignor to The Board of Regents of the University of Washington, Seattle, Wash.

Filed May 22, 1987, Ser. No. 53,390
Int. Cl.[5] C12P *21/00, 19/34*; C12N *15/00*; C07H *15/12*
U.S. Cl. 435—69.1 14 Claims

1. An isolated DNA sequence that functions to produce increased yields of cloning and expression vectors and also increased expression of an associated gene, when introduced into a host prokaryotic, yeast, or COS-1 cell, said cell not containing a restriction enzyme that cleaves said vectors, said sequence containing a functionally active portion of the DNA segment corresponding to the nucleic acid sequence shown in FIGS. 5(*a*), (*b*), and (*c*), joined in the order (a), (b), and (c).

4,966,842

STRUCTURAL GENES ENCODING THE VARIOUS ALLELIC AND MATURATION FORMS OF PREPROTHAUMATIN RECOMBINANT CLONING VEHICLES, COMPRISING SAID STRUCTURAL GENES AND EXPRESSION THEREOF IN TRANSFORMED MICROBIAL HOST CELLS

Cornelis T. Verrips, Maassluis; Jan Maat, Monster; Luppo Edens, Maassluis, and Adrianus M. Ledeboer, Rotterdam, all of Netherlands, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Continuation of Ser. No. 732,818, May 10, 1985, Pat. No. 4,771,000, which is a continuation of Ser. No. 329,830, Dec. 11, 1981, abandoned. This application May 17, 1988, Ser. No. 194,923
Claims priority, application United Kingdom, Dec. 12, 1980, 8039854
The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.
Int. Cl.[5] C12P *21/00, 21/02*; C12N *15/00, 1/00, 1/20*; C07H *21/04*
U.S. Cl. 435—69.1 6 Claims

1. A DNA fragment consisting essentially of a structural gene encoding a protein selected from the group consisting of preprothaumatin, prethaumatin and prothaumatin.

4,966,843

EXPRESSION OF INTERFERON GENES IN CHINESE HAMSTER OVARY CELLS

Francis P. McCormick, Albany; Michael A. Innis, Oakland, and Gordon M. Ringold, Palo Alto, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 438,991, Nov. 1, 1982. This application Jul. 31, 1985, Ser. No. 761,180
Int. Cl.[5] C12P *28/00*; C12N *15/00, 5/00*; C07H *21/04*
U.S. Cl. 435—69.51 21 Claims

1. A DNA construct for the expression of the human interferon gene in Chinese hamster ovary cells or progeny thereof comprising an operable linkage of:

(a) a nucleotide sequence from a cloning vector which allows for replication in a prokaryotic cell;

(b) a first gene capable of transcription and translation in Chinese hamster ovary cells or progeny thereof operably linked to a selectable marker for the selection of Chinese hamster ovary cell transformants or progeny thereof; and

(c) a human interferon gene capable of transcription and translation in Chinese hamster ovary cells or progeny thereof.

4,966,844

METHOD FOR MICROBIAL CELL KILLING

Michael J. Tallen, and Dennis M. Fenton, both of Thousand Oaks, Calif., assignors to Amgen, Thousand Oaks, Calif.

Filed Sep. 3, 1985, Ser. No. 771,883
Int. Cl.[5] C12P 21/00; C12N 1/06, 1/02
U.S. Cl. 435—71.2 1 Claim

1. In a process for the recovery of biologically active polypeptides from fermentation cultures of recombinant host microorganisms wherein host cell death is a prerequisite for isolation processing of the recombinant product outside the fermentation vessel, an improvement in methods for effecting efficient host cell death, said improvement consisting essentially of uniformly contacting host cells selected from the group consisting of *Escherichia coli, Pseudomonas aeruginosa* and *Bacillus subtilis* in culture with microbicidal concentrations of benzyl alcohol.

4,966,845

MICROBIAL PRODUCTION OF L-ALTROSE

Robert J. Stack, Peoria, Ill., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 24, 1988, Ser. No. 159,995
Int. Cl.[5] C12P 19/02, 19/26; C12N 1/20, 1/22
U.S. Cl. 435—105 3 Claims

1. A process for producing L-altrose comprising:
a. inoculating a suitable growth medium with a strain of the bacterium, *Butyrivibrio fibrisolvens*, which produces an L-altrose-containing extracellular polysaccharide;
b. cultivating the bacterium; on the medium under conditions suitable for the growth of the bacterium;
c. hydrolyzing the extracellular polysaccharide in the culture medium to produce a hydrolysate; and;
d. recovering L-altrose from said hydrolysate;

4,966,846

MOLECULAR CLONING AND EXPRESSION OF A VIBRIO PROTEOLYTICUS NEUTRAL PROTEASE GENE

Alan H. Deutch, and Victor A. David, both of Columbia, Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 103,983, Oct. 1, 1987, abandoned. This application Nov. 19, 1987, Ser. No. 123,038
Int. Cl.[5] C12N 9/48, 9/52, 1/20, 1/00, 15/00; C12P 21/04, 19/34; C07H 15/12; C07K 13/00
U.S. Cl. 435—172.3 11 Claims

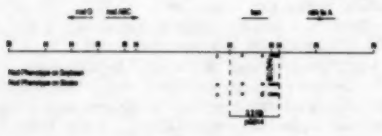
1. A recombinant DNA which encodes a functional neutral protease isolated from *Vibrio proteolyticus* which exhibits enzymatic activity in the milk cleaning assay.

4,966,847

RECOMBINANT DNA CLONES CONTAINING A BROAD HOST RANGE GENE FROM *BRADYRHIZOBIUM JAPONICUM*

Gary Stacey, 2304 Sutters Mill La., Knoxville, Tenn. 37923; Anthony J. Nieuwkoop, 390 Mayfair St., Holland, Mich. 49424, and Zsofia Banfalvi, u7 18/B, H-6723 Szeged Vajda, Hungary

Filed Jul. 27, 1987, Ser. No. 78,339
Int. Cl.[5] C12N 15/00, 1/00; C12R 1/41; C07H 15/12
U.S. Cl. 435—172.3 4 Claims



2. A method for restricting the host range of a bacterial strain of *B. japonicum*, which strain nodulates both soybean and siratro, which method comprises disrupting a host range gene of said strain, which host range gene is located between nodABCD genes and nifA and fixA genes on the chromosome of *B. japonicum* and is contained in a 3.3 Kb HindIII restriction fragment in a region of having a HindIII restriction map sequence of 3.3, 5.6, 3.9, 1.7, 2.3, 4.5, 4.6 and 4.3 kb as consecutive, contiguous fragments of DNA in *B. japonicum* strains characterized by such a restriction map sequence, so that the resulting strain is unable to nodulate siratro.

4,966,848

ISOLATION, PURIFICATION, CHARACTERIZATION, CLONING AND SEQUENCING OF N α-ACETYLTRANSFERASE

John A. Smith, Brookline, and Fang-Jen S. Lee, Somerville, both of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 153,361, Feb. 8, 1988, abandoned. This application Dec. 14, 1988, Ser. No. 284,344
Int. Cl.[5] C12N 9/10
U.S. Cl. 435—193 7 Claims

1. A substantially purified N^{α}-acetyltransferase having the following characteristics:
(a) a molecular weight of about 180,000;
(b) two subunit peptides having molecular weights of about 95,000 each;
(c) pH optimum 9.0;
(d) maximum specific activity at temperature from 30° to 42° C. wherein one unit of specific activity is defined as 1 pmol of acetyl residues incorporated into a substrate containing the first 24 amino acid residues of adrenocorticotropic hormone (ACTH) per mg of protein under standard conditions;
(e) inhibited by divalent cations Cu^{2+} and Zn^{2+}; and
(f) an ability to acetylate a substrate peptide or protein molecule wherein said ability is specifically dependent on the amino-terminal residue of said substrate peptide or protein molecule.

4,966,849

CDNA AND GENES FOR HUMAN ANGIOGENIN (ANGIOGENESIS FACTOR) AND METHODS OF EXPRESSION

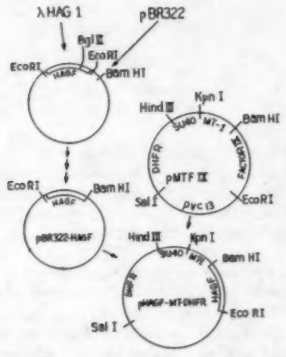
Bert L. Vallee, Brookline, Mass., and Kotoku Kurachi, Ann Arbor, Mich., assignors to President and Fellows of Harvard College, Cambridge, Mass.

Continuation-in-part of Ser. No. 105,106, Oct. 5, 1987, abandoned, which is a continuation of Ser. No. 778,547, Sep. 20, 1985, Pat. No. 4,721,672. This application Feb. 2, 1989, Ser. No. 305,968
Int. Cl.[5] C12N 9/22, 15/00; C07K 3/00; C07H 15/12
U.S. Cl. 435—199 22 Claims

1. A mutated angiogenin protein having the amino acid sequence in FIG. 1, except that the lysine at or corresponding to position 40 has been replaced with another amino acid, said mutated angiogenin protein having decreased angiogenic and ribinucleolytic activity.

2. A DNA sequence comprising a nucleotide sequence encoding a mutated angiogenin protein, which protein has the

amino acid sequence in FIG. 1, except that the lysine at or corresponding to position 40 has been replaced with another



amino acid, said mutated angiogenin protein having decreased angiogenic and ribonucleolytic activity.

4,966,850

PRODUCTION OF THERMOSTABLE XYLANASE AND CELLULASE

Ernest K. C. Yu, Brampton; Larry U. L. Tan, Navan, and John N. Saddler, Ottawa, all of Canada, assignors to Forintek Canada Corp., Ottawa, Canada

Continuation of Ser. No. 5,853, Jan. 21, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 340,307

Int. Cl.[5] C12N *9/24, 9/42*

U.S. Cl. 435—200 **14 Claims**

1. A process for the production of a thermally stable xylanase enzyme preparation having no significant cellulase enzyme activity, and suitable for the selective hydrolysis of hemicellulose in mixed cellulose and hemicellulose substrates, which process comprises

culturing the 235E strain *Thermoascus aurantiacus* microorganism in a nutrient culture medium containing at least one cellulosic or hemicellulosic substrate;

separating from the culture medium a culture filtrate containing a major proportion of xylanase enzymes and a minor proportion of cellulase enzymes; and

incubating the culture filtrate at a temperature of at least about 60° C. for a time sufficient to selectively inactivate the cellulase enzymes and recovering a culture filtrate having xylanase enzyme activity, but no significant cellulase enzyme activity.

4,966,851

PROCESS FOR ISOLATION OF LYSOZYME AND AVIDIN FROM EGG WHITE

Timothy Durance; Eunice Li-Chan, and Shuryo Nakai, all of Vancouver, Canada, assignors to The University of British Columbia, Vancouver, Canada

Filed Nov. 19, 1987, Ser. No. 122,848

Claims priority, application Canada, Dec. 1, 1986, 524200

Int. Cl.[5] C12N *9/36*; C07K *3/18, 3/22*

U.S. Cl. 435—206 **9 Claims**

1. A process for the isolation and separation of lysozyme and avidin from egg while which comprises:

step (a) contacting egg white with a weakly acidic cation exchange resin having a greater affinity for avidin than for lysozyme, whereby lysozyme and avidin are adsorbed on to said resin;

separating said resin from said egg white and washing said resin to remove residual egg white therefrom; and

contacting said washed resin with a low ionic strength eluting buffer whereby lysozyme is eluted from said resin while avidin remains adsorbed on said resin; and

step (b) repeating the complete procedure defined in step (a) for two or more times; and

step (c) finally contacting said resin containing accumulated adsorbed avidin with a high ionic strength eluting buffer whereby avidin is eluted from said resin.

4,966,852

DNA CLONE OF HUMAN TISSUE FACTOR INHIBITOR

Tze-Chein Wun, St. Louis; Kuniko K. Kretzmer, Eureka, and George J. Broze, Jr., St. Louis, all of Mo., assignors to Monsanto Company and Washington University, both of St. Louis, Mo.

Continuation-in-part of Ser. No. 77,366, Jul. 23, 1987. This application Nov. 23, 1987, Ser. No. 123,753

Int. Cl.[5] C12N *7/00, 9/00, 15/12*

U.S. Cl. 435—235 **3 Claims**

2. The cDNA sequence having the nucleotide sequence shown in FIG. 3 which encodes human tissue factor inhibitor having the amino acid sequence shown in FIG. 3.

4,966,853

CELL CULTURING APPARATUS

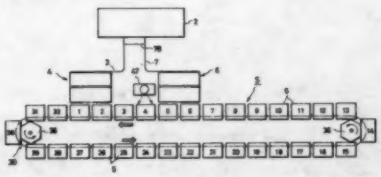
Shoichi Matsuda; Akira Suzuki, both of Tokyo, and Tatsuo Kaise, Yokosuka, all of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1988, Ser. No. 158,663

Claims priority, application Japan, Jul. 20, 1987, 62-180386; Jan. 22, 1988, 63-60190[U]

Int. Cl.[5] C12M *3/00*

U.S. Cl. 435—284 **14 Claims**



1. A cell culturing apparatus comprising:

a culturing chamber having side walls defining an internal space;

means for maintaining said internal space at a predetermined temperature;

handling windows provided at one side wall of said culturing chamber;

at least one rotary rack supporting apparatus installed in said culturing chamber, said rack supporting apparatus comprising a loop track and a plurality of culturing racks adapted to travel on said loop track, said culturing racks accomodating therein a plurality of culturing containers;

container handling stations disposed adjacent to said one side wall of said culturing chamber having means for filling culture medium into said culturing containers, cell inoculation thereinto, and rinsing said culturing containers;

a working spot provided between said one side wall and said container handling stations having means for removing said culturing containers from said culturing rack through said handling windows to feed the containers into said container handling apparatus and for transferring said culturing containers from said container handling apparatus to said culturing rack; and,

a transferring conveyor means having a part installed on said working spot and a remaining part installed on said container handling station for feeding the culturing containers

from said working spot into said container handling apparatus and vice versa.

4,966,854

RADIO LABELLED DYE COMPOSITION FOR DETECTING PROTEINS IN GELS

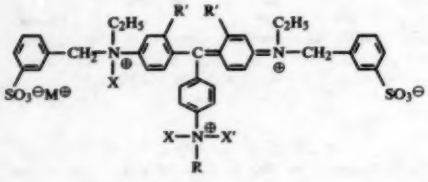
James E. Fleming, San Jose, Calif., assignor to Linus Pauling Institute of Science and Medicine, Palo Alto, Calif.

Continuation-in-part of Ser. No. 828,827, Feb. 12, 1986, Pat. No. 4,769,334. This application May 12, 1988, Ser. No. 192,993

Int. Cl.[5] **G01N** *23/00, 33/68*

U.S. Cl. 436—57 **3 Claims**

1. A dye composition consisting essentially of compounds of the Formula (I):

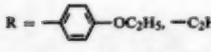


(I)

$X = {}^{14}CH_3, \ldots;$

$X' = H, -C_2H_5, {}^{14}CH_3;$

$M^{\oplus}$ is a cation;



$R' = H, -CH_3;$

with the proviso that at least one X or X' group is the isotopic label 14_{CH3} wherein said label is present in said composition in an amount sufficient to make said composition detectable by the presence of said label in greater than the naturally occurring amount of ^{14}C.

4,966,855

NEW REDOX INDICATORS

Ulfert Deneke, Rimbach-Zotzenbach; Werner Güthlein, Mannheim; Wolfgang Weckerle, Grünstadt, and Hans Wielinger, Weinheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GMBH, Manheim, Fed. Rep. of Germany

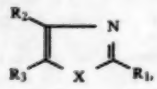
Filed Jul. 2, 1985, Ser. No. 751,367

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1984, 3425118

Int. Cl.[5] **G01N** *33/72;* **C12Q** *1/28;* **C07D** *263/30*

U.S. Cl. 436—66 **7 Claims**

1. A compound of the formula



(I)

wherein

X is oxygen or sulphur;

R_1 is julolidine, tetrahydroquinoline or tetrahydroquinoline with substituted or unsubstituted C_1–C_6 alkyl on the nitrogen atom, the substituents being a sulfo phosphonic acid or carboxylic acid residue, or R_1 is a group of the formula

wherein

R_4 is hydroxyl or mono-or dialkylated amino wherein each alkyl contains up to 6 carbon atoms and is unsubstituted or substituted one or more times by a hydroxyl, alkoxy, halogen, morpholine, or a sulfo, carboxylic acid or phosphonic acid residue, which acid residue is optionally esterified,

R_5 and R_6, which can be the same or different, are hydrogen, C_1–C_6 alkyl, C_1–C_6 alkoxy or C_1–C_6 alkyl substituted one or more times by halogen, hydroxyl, methoxy, carboxy, a morpholino radical, a sulfo or a phosphonic acid residue, which can also be esterified by methanol or ethanol, or C_1–C_6 alkoxy substituted by a carboxyl group,

R_2 is hydrogen, C_1–C_6 alkyl, or C_1–C_6 alkyl, substituted one or more times by halogen, hydroxyl, methoxy, carboxy, a morpholino radical, a sulfo acid or a phosphonic acid residue, which can also be esterified by methanol or ethanol, or C_1–C_6 alkoxy substituted by a carboxyl group, or is julolidine, tetrahydroquinoline or tetrahydroquinoline substituted with substituted or unsubstituted C_1–C_6 alkyl on the nitrogen atom, the substituents being a sulfo, phosphonic acid or carboxylic acid residue, or is a group of the formula:

wherein

R_5 and R_6 have the same meanings as above and

R'_4 is hydroxyl, amino, or mono- or dialkylated amino wherein the alkyl groups contain up to 6 carbon atoms and are unsubstituted or substituted one or more times by a hydroxyl, alkoxy, halogen, morpholine, or a sulfo, carboxylic acid or phosphonic acid residue, which acid residue is optionally esterified; and

R_3 has the same meaning as R_2 or is C_1–C_6 alkoxy, dialkylamino with up to 6 carbon atoms in each alkyl or phenyl, or is cycloalkyl with 3 to 7 carbon atoms, phenyl or pyridyl, and wherein

at least one of the residues R^2 and R^3 is julolidine, tetrahydroquinoline or tetrahydroquinoline substituted with substituted or unsubstituted C_1–C_6 alkyl on the nitrogen atom, the substituents being a sulfo, phosphonic acid or carboxylic acid residue, or is a group of the formula:

wherein R'_4, R_5, R_6 have the same meanings as above and wherein at least one of the substituents R_4 and R'_4 is hydroxyl and the salts thereof.

4,966,856

ANALYTICAL ELEMENT AND THE ANALYTICAL METHOD USING THE ELEMENT

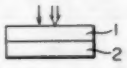
Tsukasa Ito, Musashino; Satoshi Kawakatsu, Hachioji; Akira Onishi, Hino, and Masayo Takekoshi, Sagamihara, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 874,504, Jun. 16, 1986, abandoned. This application Oct. 15, 1987, Ser. No. 110,096

Claims priority, application Japan, Jun. 19, 1985, 60-131955

Int. Cl.[5] G01N *31/22*

U.S. Cl. 436—170 18 Claims



1. An analytical element for measuring a specific component (X) in a fluid sample by means of competing reactions between a reaction of said component (X) with a material (R) which is capable of being specifically bound to said component (X) or an analogue (AX) of said component (X), and a reaction of a labeled-material (LX), which is formed from binding said specific component (X) or the analogue thereof (AX) with a labeling material (L), with said material (R), said analytical element comprising

a first layer containing said material (R) immobilized therein and, a second layer containing a material (A) which is capable of at least reducing a signal caused by said labeling material (L) in said labeled-material (LX) by specifically binding with a labeling portion of said labeled-material (LX), said first and said second layers being porous.

18. A method for the measurement of a specific component (X) in a fluid sample by means of competing reactions between a reaction of said component (X) with a material (R) which is capable of being specifically bound with said component (X) or an analogue of said component (AX), and a reaction of a labeled-material (LX), which is formed from binding said component (x) or the analogue thereof (Ax) with a labeling material (L), with said material (R), said method comprising,

providing said fluid sample and said labeled-material (LX) into an analytical element comprising as its structural member; a first layer containing said material (R) immobilized therein and, a second layer containing a material (A) which is capable of at least reducing a signal caused by said labeling material (L) in said labeled-material (LX) by specifically binding with a labeling portion of said labeled-material (LX), said first and said second layers being porous; and measuring strength of signal caused by said labeling material (L).

4,966,857

DATA CARRIER HAVING AN INTEGRATED CIRCUIT AND A METHOD FOR PRODUCING SAME

Yahya Haghiri-Tehrani, and Joachim Hoppe, both of Munich, Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

Division of Ser. No. 106,890, Oct. 13, 1987, Pat. No. 4,792,843, which is a continuation of Ser. No. 752,072, Jun. 21, 1985, abandoned. This application Dec. 16, 1988, Ser. No. 285,656

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1983, 3338597

Int. Cl.[5] H01L *23/28*

U.S. Cl. 437—209 4 Claims

1. A method of making a laminated, multi-layer data carrier including at least a core layer including a planar top surface and a recess, an upper cover layer including apertures and a carrier element including a flexible film substrate carrying an IC module, electrical contact pads formed as a thin electrically conductive coating on the substrate, and electrical leads connecting the contact pads to the IC module, the method comprising:

(a) positioning the substrate with the contact pads, leads and IC module on the top surface of the core layer so that the IC module is disposed in the area of the recess in the core layer;

(b) positioning the upper cover layer above the substrate, IC module, leads and contact pads so that the cover apertures are aligned with the contact pads;

(c) laminating the core layer, substrate and cover layer together by using heat and pressure;

(d) at least the core layer being a thermoplastic material and said step of laminating using heat and pressure including softening said core layer to cause it to flow towards the apertures of the cover layer beneath the contact pads and the substrate so that the substrate and contact pads are pressed into the apertures until the contact pads are flush with the outer surface of the cover layer and so that the IC module is positioned substantially within the recess of the core layer.

4,966,858

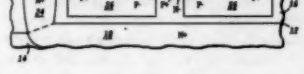
METHOD OF FABRICATING A LATERAL SEMICONDUCTOR STRUCTURE INCLUDING FIELD PLATES FOR SELF-ALIGNMENT

Michael P. Masquelier, Mesa, and David N. Okada, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Nov. 2, 1989, Ser. No. 430,396

Int. Cl.[5] H01L *21/328*

U.S. Cl. 437—27 17 Claims



1. A method of fabricating a lateral semiconductor structure comprising the steps of:

providing a substrate;

forming wells in said substrate;

forming field oxidation regions on said substrate above said wells;

forming field plates at least partially on said field oxidation regions;

forming a first active device region in said substrate, said first active device region being of a first conductivity type and its formation being self-aligned to said field plates; and

forming a second active device region in said first active device region, said second active device region being of a second conductivity type and its formation also being self-aligned to said field plates.

4,966,859

VOLTAGE-STABLE SUB-μM MOS TRANSISTOR FOR VLSI CIRCUITS

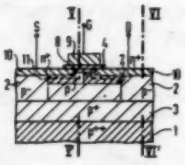
Lothar Risch, Ottobrunn; Reinhard Tielert, Munich; Wolfgang Mueller, Putzbrunn, and Christoph Werner, Krailling, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich

Division of Ser. No. 462,401, Jan. 31, 1983, abandoned. This application Jan. 3, 1989, Ser. No. 293,567

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1982, 3208500

Int. Cl.[5] H01L *21/266*

U.S. Cl. 437—29 3 Claims



1. A method for manufacturing a voltage-stable short-channel MOS transistor having a sub-μm channel length with the following characteristics;

(a) a semiconductor substrate of a first conductivity type and an epitaxial layer planarly disposed thereupon and an insulating layer disposed on said epitaxial layer, a gate electrode disposed on said insulating layer, said electrode consisting of polysilicon, said epitaxial layer having highly doped source and drain zones of the second conductivity type extending into its surface region, with a region of the first conductivity type functioning as a channel zone disposed between the source and drain zones, said region exhibiting a different concentration of implanted doping substance in the direction of the substrate;

(b) the substrate of the first conductivity type is formed of low-resistant material and the epitaxial layer is formed of high-resistant material and of the same conductivity type as the substrate;

(c) the epitaxial layer has a thickness which maximally amounts to ten times the depth of the source/drain zones but which at least amounts to twice the depth of the concentration maximum of the doping substance implanted in the channel zone;

(d) the channel region of the first conductivity type exhibits an increasing doping concentration in the direction of the substrate, whereby the concentration maximum of the implanted doping substance of the first conductivity type in the channel region of the first conductivity type is overlain by the source and drain zones of the second conductivity type, such that the region with the concentration maximum of the implanted doping substance shields the edges of the source and drain zones in the region of the gate electrode;

said method comprising the steps of:

(e) precipitating an epitaxial, p-doped silicon layer with a layer thickness in the range from 1.5 through 5 μm on a lower-resistant substrate consisting of p-conductive silicon;

(f) growing thereon an insulating layer for use as a gate oxide layer;

(g) applying an implantation mask consisting of photosensitive resist such that the gate region of the transistor to be produced layer remains free thereof;

(h) executing a double implantation in the channel region by means of superimposing a deep and flat boron ion implantation by means of setting different implantation energies and doses, said deep boron ion implantation being performed with a higher dose than said flat boron ion implantation;

(i) removing the implantation mask;

(j) generating and structuring the gate electrode consisting of polysilicon; and

(k) executing the source-drain implantation at the outer surface of said epitaxial layer to form said source and drain zones at a level less deep than the level of maximum concentration of said deep boron ion implantation, using the gate electrode as an implantation mask whereby the source and drain zones each overlie and overlap a part of said deep boron ion implantation.

4,966,860

PROCESS FOR PRODUCING A SIC SEMICONDUCTOR DEVICE

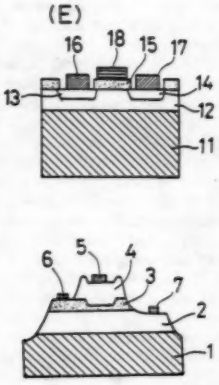
Akira Suzuki, Nara, and Katsuki Furukawa, Osaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 683,801, Dec. 19, 1984, Pat. No. 4,762,806. This application Mar. 24, 1988, Ser. No. 172,501

Claims priority, application Japan, Dec. 23, 1983, 58-252157; Dec. 27, 1983, 58-249981; Dec. 29, 1983, 58-246511

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—31 14 Claims



1. A process for producing a SiC bipolar transistor disposed on a single-crystal Si substrate, comprising the following steps:

growing at least one single crystal film of SiC on a single crystal substrate of Si while providing three regions of alternating opposite conductivity types in said SiC single-crystal film to form the entire operational area of a bipolar transistor in said SiC single-crystal film disposed on said Si substrate; and

forming electrodes for said bipolar transistor on said SiC single-crystal film by etching said SiC single-crystal film to expose portions of each of said three regions, and positioning emitter, collector and base electrodes, respectively, on said exposed portions of said three regions to produce a bipolar transistor in said SiC single-crystal film disposed on said Si single-crystal substrate.

4. A process for producing an insulated gate field effect transistor, comprising the following steps:

growing a SiC single-crystal film of one conductivity type on a Si single-crystal substrate of the opposite conductivity type;

implanting impurity ions of said opposite conductivity type within said SiC single-crystal film to form source and drain regions of said opposite conductivity type;

thermally oxidizing the surface of said SiC single-crystal film to form a silicon dioxide film;

removing a portion of said silicon dioxide film positioned on

said source and drain regions to expose said source and drain regions; and,

forming a source electrode on said source region, a drain electrode on said drain region, and a gate electrode on said silicon dioxide film between said source and drain electrodes.

4,966,861

VAPOR DEPOSITION METHOD FOR SIMULTANEOUSLY GROWING AN EPITAXIAL SILICON LAYER AND A POLYCRYSTALLINE SILICONE LAYER OVER A SELECTIVELY OXIDIZED SILICON SUBSTRATE

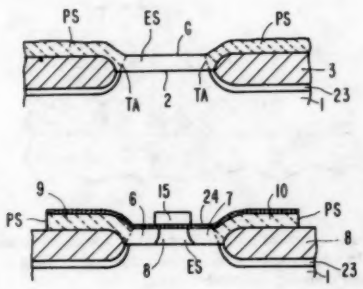
Fumitake Mieno, Kawasaki; Kazuyuki Kurita; Shinji Nakamura, both of Yokohama, and Atuo Shimizu, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki

Continuation of Ser. No. 105,570, Oct. 8, 1987, abandoned. This application Apr. 25, 1989, Ser. No. 344,439

Claims priority, application Japan, Oct. 8, 1986, 61-239910; Nov. 20, 1986, 61-276948; Nov. 20, 1986, 61-276945; Nov. 20, 1986, 61-276958; Nov. 20, 1986, 61-276972; Nov. 26, 1986, 61-281004

Int. Cl.[5] H01L *21/20*

U.S. Cl. 437—99 **8 Claims**



1. A method for fabricating a semiconductor device, comprising:

(a) implanting dopant ions into an area of the silicon substrate;

(b) forming a field oxide insulating layer on the ion implanted area of the silicon substrate, said insulating layer having an active area;

(c) cleaning the substrate by dipping in a cleaning solution;

(d) placing the silicon substrate in a reaction chamber;

(e) preheating the silicon substrate in the reaction chamber to effect desorption of gas molecules absorbed on the silicon substrate in a hydrogen ambient;

(f) introducing a reaction gas containing silicon hydride into the reaction chamber at a pressure in a range from 30–300 torr, while heating the silicon substrate at a temperature in a range from 780° C.–950° C., thereby simultaneously forming a polysilicon layer PS and an epitaxial silicon layer ES over the field oxide insulating layer, with the PS and ES layers being closely and smoothly adjoined to each other at an interface therebetween.

4,966,862

METHOD OF PRODUCTION OF LIGHT EMITTING DIODES

John A. Edmond, Apex, N.C., assignor to Cree Research, Inc., Durham, N.C.

Filed Aug. 28, 1989, Ser. No. 400,279

Int. Cl.[5] H01L *31/0312*

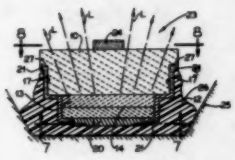
U.S. Cl. 437—100 **16 Claims**

4. A method for preparing a plurality of blue light emitting diodes on a single substrate, and in which the resulting diodes can be separated and mechanically fixed to transmit from their substrate side rather than the junction side using otherwise conventional mounting techniques, the method comprising:

forming an epitaxial layer of alpha silicon carbide on one surface of a substantially transparent silicon carbide substrate having a p or n type conductivity in which the epitaxial layer comprises a layer of p-type silicon carbide and a layer of n-type silicon carbide adjacent one another and that form a p-n junction therebetween;

etching the epitaxial layer and the substrate in a predetermined pattern to define individual diode precursors and wherein the etch is deep enough to form mesas in the epitaxial layer that delineate the p-n junctions in each diode precursor from one another;

grooving the substrate from the side of the epitaxial layer and between the mesas of the diode precursors to a predetermined depth into the substrate to define side portions of the device precursors in the substrate while retaining enough of the substrate beneath the grooves to maintain the mechanical stability of the substrate;



adding an ohmic contact to the epitaxial layer;

forming a layer of an insulating material that covers the portions of the epitaxial layer that are not covered by the ohmic contact and that covers any portions of the one surface of the substrate adjacent the mesas that are not covered by the epitaxial layer and that covers portions of the side portions of the substrate for insulating the one surface, the junction and the side portions of the substrate of each diode precursor from electrical contact other than through the ohmic contact; and

adding an ohmic contact to the substrate.

4,966,863

METHOD FOR PRODUCING A SEMICONDUCTOR LASER DEVICE

Hitoshi Mizuochi, and Hideyo Higuchi, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 11, 1989, Ser. No. 378,692

Claims priority, application Japan, Jul. 20, 1988, 63-182393

Int. Cl.[5] H01L *21/20*

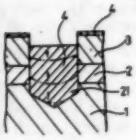
U.S. Cl. 437—129 **1 Claim**

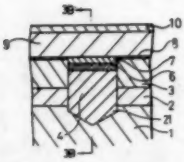
1. A method for producing a semiconductor laser including a p-n-p-n current blocking structure disposed on a first conductivity type semiconductor substrate and an active region buried in a stripe groove formed in said current blocking structure comprising:

growing a lower cladding layer in a stripe groove in a substrate by liquid phase epitaxy, nearly filling the groove;

successively growing an active layer and a waveguide layer by one of liquid phase epitaxy and metal organic chemical vapor deposition on said lower cladding layer, completely filling said groove; and

forming a diffraction grating on said waveguide layer.





4,966,864

CONTACT STRUCTURE AND METHOD

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 27, 1989, Ser. No. 329,167

Int. Cl.[5] H01L *21/44, 21/48*

U.S. Cl. 437—191 **13 Claims**

8. A method for fabricating a semiconductor device comprising the steps of:

providing a silicon substrate having an insulator layer formed on a surface thereof;

depositing a first layer of polycrystalline silicon overlying said insulator layer;

patterning said first layer of polycrystalline silicon to define an electrode;

forming an oxide layer on said electrode;

forming a contact opening through said insulator layer adjacent said electrode to expose a portion of said silicon substrate and simultaneously removing said oxide layer from a portion of said electrode adjacent said contact opening; and

selectively depositing polycrystalline silicon on said exposed portion and said portion of said electrode and forming an electrical connection therebetween.

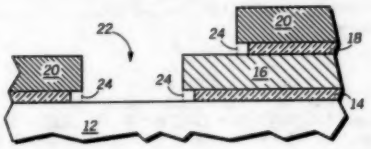
12. A method for fabricating a semiconductor device comprising the steps of:

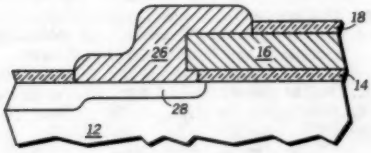
providing a first conductor structure having a first insulator layer thereover;

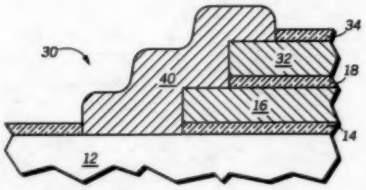
forming a second conductor structure overlying said first insulator layer;

forming a second insulator layer overlying said second conductor structure;

etching an opening through said first and second insulator layers to expose adjacent portions of said first and second conductor structures; and







selectively depositing a further layer of conductive material onto said exposed adjacent portions and forming an electrical connection therebetween.

4,966,865

METHOD FOR PLANARIZATION OF A SEMICONDUCTOR DEVICE PRIOR TO METALLIZATION

Michael T. Welch, Sugar Land; Ronald E. McMann, Rosenberg; Manuel L. Torreno, Jr., Houston; Evaristo Garcia, Jr., Rosenberg, and Jeffrey E. Brighton, Katy, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 10,937, Feb. 5, 1987, Pat. No. 4,795,722. This application Sep. 16, 1988, Ser. No. 245,886

Int. Cl.[5] H01L *21/44, 21/265*

U.S. Cl. 437—192 **19 Claims**

1. A method for fabrication of a semiconductor chip, said semiconductor chip having a conductive semiconductor interconnection layer, comprising the steps of:

patterning said conductive semiconductor interconnection layer;

forming a metal-semiconductor compound film on selected areas of said conductive semiconductor interconnection layer, then;

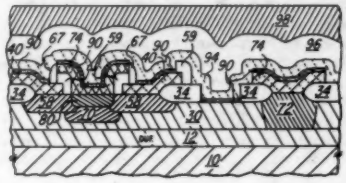
depositing a film of dielectric material onto said conductive semiconductor interconnection layer;

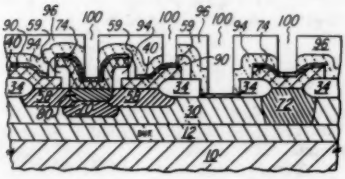
etching said film of dielectric material so that its surface is substantially planar;

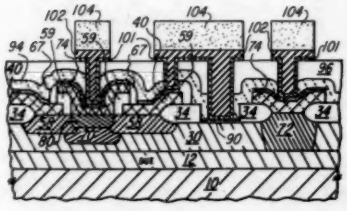
etching vias in selected locations of said film of dielectric material so that selected locations of said conductive layer with said metal-semiconductor compound film are exposed;

depositing a metal film onto said surface after said via-etching step, said metal film making contact to the exposed portions of said conductive semiconductor inter-

connection layer with said metal-semiconductor compound film; and







removing selected portions of said metal film so that the remaining portions of said metal film constitute an interconnection pattern.

4,966,866

METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE HAVING GATE ELECTRODES OF DIFFERENT CONDUCTIVITY TYPES

Yuuichi Mikata, Kawasaki, and Shuichi Samata, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 29, 1989, Ser. No. 399,213
Claims priority, application Japan, Nov. 22, 1988, 63-295420
Int. Cl.[5] H01L *21/78, 27/00*
U.S. Cl. 437—193 **11 Claims**

1. A method of manufacturing a semiconductor device having gate electrodes of different conductivity types, comprising the steps of:

forming, in a predetermined portion of a semiconductor substrate of one conductive type, a diffusion layer of an opposite conductive type;

forming a first insulating film on said semiconductor substrate, at that portion in contact with said diffusion layer;

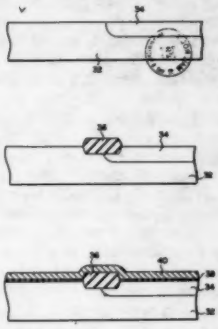
forming a second insulating film on said semiconductor substrate and said diffusion layer;

forming a first conductive film on said first and second insulating films;

forming a second conductive film of said one conductive type on a predetermined portion of said first conductive film;

forming a third conductive film, of said opposite conductive type, on the remainder of said first conductive film; and

performing a predetermined patterning of said first, second, and third conductive films, thereby forming a first gate electrode, of said one conductive type, including the first



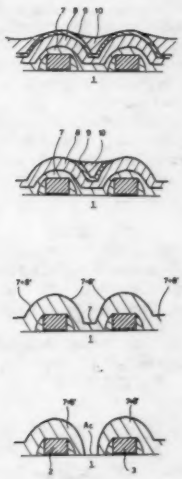
and second conductive films, and a second gate electrode, of said opposite conductive type, including said first and third conductive films.

4,966,867

PROCESS FOR FORMING SELF-ALIGNED, METAL-SEMICONDUCTOR CONTACTS IN INTEGRATED MISFET STRUCTURES

Pier L. Crotti, Landriano, and Nadia Iazzi, Cremona, both of Italy, assignors to SGS-Thomson Microelectrics s.r.l., Italy

Filed Oct. 20, 1989, Ser. No. 424,446
Claims priority, application Italy, Oct. 20, 1988, 83674 A/88
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—195 **1 Claim**



1. A process for forming self-aligned metal-semiconductor contacts in integrated MISFET structures which determine, during a phase of the fabrication process, a superficial morphology of a monocrystalline semiconductor material wafer being fabricate characterized by the presence of parallel gate lines of a first metallic material provided with tapered lateral spacers of a dielectric material, said contacts with the mono-

crystalline semiconductor being formed in areas comprised between two adjacent parallel gate lines, comprising:

(a) conformably depositing a first layer of a first dielectric oxide on the surface of the wafer being fabricated having said gate lines thereon;

(b) conformably depositing a second layer of a precursor polycrystalline metallic material capable of being converted by oxidation in an oxide substantially similar to said first dielectric oxide;

(c) conformably depositing a third layer of an oxidation resistant material;

(d) depositing a layer of a planarization material;

(e) blanket etching said layer of planarization material and said third conformably deposited layer of oxidation resistant material until exposing crests of said second conformably deposited precursor metallic material layer overlaying said gate lines and leaving residues of said planarization material and of said third conformably deposited layer of oxidation resistant material on the bottom of valleys comprised between two adjacent gate lines;

(f) selectively etching said residues of planarization material removing them completely from said valleys;

(g) thermally oxidizing said precursor polycrystalline metallic material until converting the entire thickness thereof in areas unmasked from oxidation by said residue of said third conformably deposited layer of oxidation resistant material covering said valleys into a dielectric oxide similar to said first dielectric oxide of said first conformably deposited layer;

(h) selectively etching said residue of oxidation resistant material and unconverted residues of said precursor metallic material, respectively of said third and of said second conformably deposited layers, until removing said residues from said valleys;

(i) masking the areas which are not destined to the formation of said contacts;

(l) etching the dielectric oxide layer of disuniform thickness until exposing the surface of said monocrystalline semiconductor material in unmasked zones of the bottom of said valleys where the thickness of said dielectric oxide layer corresponds to the thickness of said first conformably deposited layer not incremented in thickness by the conversion into a similar dielectric oxide of said second conformably deposited precursor metallic layer as in zones out of said valleys;

the formation of said metal-semiconductor contacts being completed by depositing a metal through etched apertures of said dielectric layer along the bottom of said valleys between two adjacent gate lines.

4,966,868

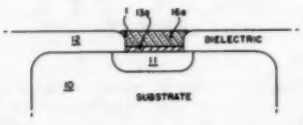
PROCESS FOR SELECTIVE CONTACT HOLE FILLING INCLUDING A SILICIDE PLUG

Venkatesan Murali; Chih-Shih Wei, both of Sunnyvale, and David B. Fraser, Danville, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 194,447, May 16, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,881

Int. Cl.[5] H01L *21/283*

U.S. Cl. 437—193 **6 Claims**



1. A process for selectively filling contact holes in a dielectric, each of said holes having a predetermined depth and overlying one of an n-type or p-type region on a complimentary metal oxide semiconductor (CMOS) device comprising the steps of:

depositing a selective polysilicon layer in said holes, said selective polysilicon layer having a thickness of not greater than one half of said depth of said holes;

implanting an n-type dopant in said holes overlying said n-type region, and implanting a p-type dopant in said holes overlying said p-type region by ion implantation;

activating said dopant in said holes resulting in a doped selective silicon layer;

depositing a second undoped selective silicon layer in said holes over said doped selective silicon layer until a predetermined level is reached;

depositing a refractory metal layer over said undoped second selective silicon layer;

annealing said layers to consume said undoped second layer and part of said doped selective silicon layer, producing a self-aligned refractory metal silicide plug.

4,966,869

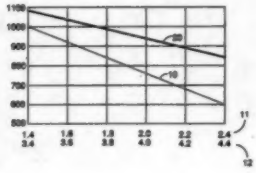
TUNGSTEN DISILICIDE CVD

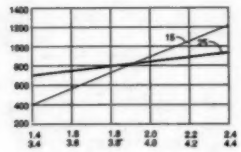
Joseph T. Hillman; J. B. Price, both of Scottsdale, and William M. Triggs, Tempe, all of Ariz., assignors to Spectrum CVD, Inc., Phoenix, Ariz.

Filed May 4, 1990, Ser. No. 519,538

Int. Cl.[5] H01L *21/443*

U.S. Cl. 437—200 **4 Claims**





1. In a method for depositing a tungsten disilicide layer on a wafer heated to a temperature above 450° C. in a chamber through which a gas mixture of WF_6 and SiH_2Cl_2 flows, the improvement comprising the step of:

adding less than ten percent disilane to said gas mixture.

4,966,870

METHOD FOR MAKING BORDERLESS CONTACTS

Jeffrey R. Barber, Pittsburgh, Pa.; Charles P. Breiten, Manassas, Va.; David Stanasolovich, Manassas, Va., and Jacob F. Theisen, Manassas, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 181,354, Apr. 14, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,399

Int. Cl.[5] H01L *21/465*

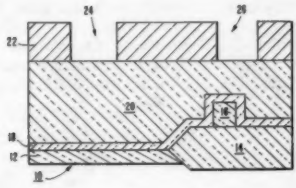
U.S. Cl. 437—228 **16 Claims**

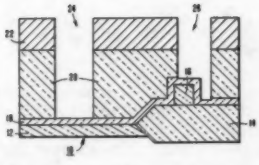
7. A process for making semiconductor device interconnections comprising the steps of:

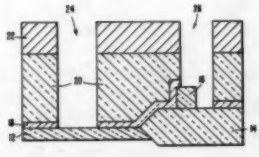
providing a plurality of semiconductor devices having active regions;

depositing a diffusion protecting/etch stop layer over said active regions;
depositing an insulating layer over said diffusion protecting-/etch stop layer;
depositing a layer of photoresist over said insulating layer;
lithographically defining a pattern of contact windows in said photoresist layer;
selectively etching said pattern of contact windows into said insulating layer with BCl_3 at a selectivity of at least 11:1;
etching said pattern of contact windows into said diffusion protecting/etch stop layer with CH_3F or O_2/CHF_3; and
depositing at least one electrical interconnection layer.

13. A method for making borderless contact windows through an insulating layer and a diffusion protecting/etch stop layer comprising the steps of:







providing a semiconductor device having active regions;
depositing a diffusion protecting/etch stop layer of silicon nitride over said active regions;
depositing an insulating layer of borophosphosilicate glass over said silicon nitride layer;
depositing a layer of photoresist over said borophosphosilicate glass layer;
lithographically defining a pattern of contact windows in said photoresist layer;
selectively etching at a selectivity of at least about 11:1 said pattern of contact windows into said borophosphosilicate glass layer using BCl_3 as the etch gas to expose the silicon nitride in said pattern of contact windows; and
etching the silicon nitride remaining in said pattern of contact windows using CH_3F or O_2/CH_3.

4,966,871

METHOD FOR VACUUM DRYING THIXOTROPIC AGENTS AND THE RESULTANT LOW MOISTURE THIXOTROPE

Lamar E. Brooks, 57 Temple Rd., Wellesley, Mass. 02181

Filed Mar. 10, 1989, Ser. No. 321,588
Int. Cl.[5] C04B *33/30*
U.S. Cl. 501—150 **3 Claims**

1. A method for producing a thixotropic attapulgite which comprises the step of heating thixotropic attapulgite in a vacuum from about 0.08 mm Hg to about 0.8 mm Hg at a temperature of between about 100° C. and about 300° C. and for a time sufficient to reduce the moisture content of the attapulgite to from about 2% to about 5%, such that the thixotropic properties of the attapulgite are retained.

4,966,872

BACTERIOSTATIC ACTIVATED CARBON FILTER

Carl Horowitz, Brooklyn; Mohan Sanduja, Flushing, and Michael Dichter, deceased, late of Brooklyn, all of N.Y. (by Anna Dichter and Wilhelm Dichter, heirs), assignors to Puro Corporation of America, Maspeth, N.Y.

Division of Ser. No. 244,502, Sep. 14, 1988, Pat. No. 4,898,676. This application Oct. 20, 1989, Ser. No. 424,606
Int. Cl.[5] B01J *37/36, 20/26;* A61K *31/79, 31/78*
U.S. Cl. 502—7 **8 Claims**

1. Bacteriostatic activated carbon, said activated carbon having chemically grafted and covalently bonded thereto in a germicidal effective amount a polymerized salt of a polymerizable anionic monomer and a cationic germicide, said chemically grafted salt remaining permanently bound to said activated carbon without leaching or desorbing therefrom upon passage of water across the same.

4,966,873

CATALYSTS FOR THE REMOVAL OF NITROGEN OXIDES

Kozo Iida; Toru Seto, and Yoshiaki Obayashi, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,718
Claims priority, application Japan, Dec. 2, 1987, 62-304770
Int. Cl.[5] B01J *21/16*
U.S. Cl. 502—84 **2 Claims**

1. A catalyst for the removal of nitrogen oxides which is characterized in that the catalyst contains Component A comprising type II anhydrous gypsum and Component B comprising titanium oxide, the sum of the weights of Components A and B is equal to or more than 80 weight % of the total weight of the catalyst, the weight ratio of Component B to (Component A+Component B) is between 0.05 and 0.3, and the catalyst contains clay, an inorganic fiber and at least one or more of the oxides of vanadium tungsten, molybdenum, iron, copper, chromium and manganese.

4,966,874

PROCESS FOR PREPARING LINEAR ALPHA-OLEFINS USING ZIRCONIUM ADDUCTS AS CATALYSTS

David A. Young; Larry O. Jones, and Troy J. Campione, all of Baton Rouge, La., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 195,665, May 18, 1988, Pat. No. 4,855,525, which is a continuation-in-part of Ser. No. 63,662, Jun. 19, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 325,878
Int. Cl.[5] B01J *31/38*
U.S. Cl. 502—117 **4 Claims**

1. An catalyst composition consisting essentially of a mixture in solution of (a) an adduct of $ZrCl_4$ with an acetate ester of the formula CH_3COOR where R represents alkyl of 6 to 16 carbon atoms and the mol ratio of acetate ester to zirconium is about 0.9 to 1 up to about 2 to 1 and (b) an alkyl metal selected from

the group consisting of R_2AlX, $RAlX_2$, $R_3Al_2X_3$, R_3Al and R_2Zn where R is C_1–C_{20} alkyl and X is Cl or Br.

4,966,875

WEAR-RESISTANT CERAMIC FOR CASTING RARE EARTH ALLOYS

Adolph L. Micheli, and Dennis F. Dungan, both of Mt. Clemens, Mich., assignors to General Motors Corp., Detroit, Mich.

Filed Sep. 24, 1987, Ser. No. 100,428

Int. Cl.[5] C04B *35/50*

U.S. Cl. 501—152 **4 Claims**

1. An refractory ceramic which consists essentially of at least about 84 weight percent yttrium oxide and from 10 to about 16 weight percent aluminum oxide and is comprised predominantly of a $Y_2O_3.Al_2O_3$ monoclinic phase.

4,966,876

TRANSESTERIFICATION OF TRIGLYCERIDES

Viswanatha Sankaran, 6A D'Silva Rd., Madras 600004, India

Filed Aug. 22, 1989, Ser. No. 396,933

Int. Cl.[5] B01J *31/02*

U.S. Cl. 502—171 **10 Claims**

1. A catalytically active material comprising polyalkoxides formed by the reaction of a plurality of dihydroxy alcohols with glycerol and a plurality of alkali metal hydroxides.

4,966,877

METHOD FOR MAKING HETEROPOLYACID CATALYSTS AND CATALYSTS MADE BY THE METHOD

Klaus Langerbeins, Langen, and Wilhelm Gruber, Darmstadt, both of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 358,698, May 26, 1989, abandoned, which is a continuation of Ser. No. 171,567, Mar. 22, 1988, abandoned. This application Feb. 12, 1990, Ser. No. 480,328

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710784

Int. Cl.[5] B01J *27/16, 27/19, 27/199*

U.S. Cl. 502—209 **4 Claims**

1. A method for making an oxidation catalyst having improved stability, which method comprises mixing, in water,

(A) a member selected from the group consisting of catalytically active heteropolyacids of molybdenum of the formula

$$H_{3+x}PMo_{12-x}V_xO_{40}$$

wherein x = 1 or 2, and metal salts of such heteropolyacis, and

(B) a water soluble organic polymer having a molecular weight greater than 10,000, drying the mixture, and then calcining the dried mixture at a temperature from 200° C. to 400° C. in the presence of oxygen.

4,966,878

NOVEL PLATINUM AGGLOMERATED IRIDIUM CATALYSTS

William C. Baird, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jul. 3, 1989, Ser. No. 375,223

The portion of the term of this patent subsequent to Oct. 30, 2007, has been disclaimed.

Int. Cl.[5] B01J *27/138*

U.S. Cl. 502—226 **9 Claims**

1. A catalyst composition for the reforming of naphthas, which composition is comprised of: about 0.01 to 2 wt. % platinum; 0.01 to 2 wt. % iridium agglomerated to exhibit a crystallinity greater than 50 percent, as measured by x-ray; up to 3.5 wt. % of a halide; and the balance being alumina modified with about 100 to 500 wppm of Si and at least 10 wppm of one or more alkaline-earth metals selected from Ca, Mg, Ba, and Sr, wherein the total amount of modifier does not exceed about 5000 wppm.

4,966,879

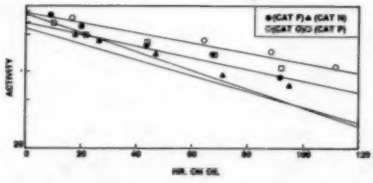
NOVEL PLATINUM-IRIDIUM REFORMING CATALYSTS

William C. Baird, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jul. 3, 1989, Ser. No. 375,220

Int. Cl.[5] B01J *27/138*

U.S. Cl. 502—226 **7 Claims**



1. A catalyst composition for reforming naphthas, which composition is comprised of 0.01 to 2 wt. % platinum; 0.01 to 2 wt. % iridium, up to 2 wt. % rhenium, up to 3.5 wt. % of a halide; and the balance being alumina modified with about 100 to 500 wppm of Si and at least 10 wppm of one or more alkaline earth metals selected from the group consisting of Ca, Mg, Ba, and Sr, wherein the total amount of modifier does not exceed about 5000 wppm.

4,966,880

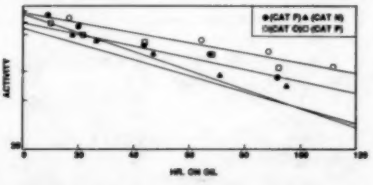
NOVEL PLATINUM-TIN-ALUMINA REFORMING CATALYSTS

William C. Baird, Jr.; Kenneth L. Riley, and George A. Swan, III, all of Baton Rouge, La., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jul. 3, 1989, Ser. No. 375,656

Int. Cl.[5] B01J *21/08, 21/12, 21/14*

U.S. Cl. 502—242 **8 Claims**



1. A catalyst composition for the reforming of naphthas, which composition is comprised of: about 0.01 to 2 wt. % platinum; 0.01 to 2 wt. % tin; alumina; and a modifier comprised of about 100 to 500 wppm of Si and at least 10 wppm of one or more alkaline-earth metals selected from Ca, Mg, Ba,

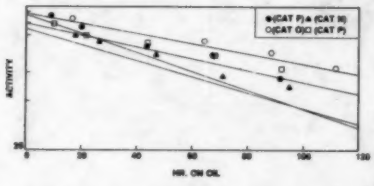
and Sr, wherein the total amount of modifier does not exceed about 5000 wppm.

4,966,881

NOVEL PLATINUM-ALUMINA REFORMING CATALYSTS

William C. Baird, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jul. 3, 1989, Ser. No. 375,219
Int. Cl.[5] B01J *21/10, 21/14, 21/06*
U.S. Cl. 502—252 **5 Claims**



1. A catalyst composition for reforming naphthas, which composition is comprised of 0.01 to 2 wt. % platinum, alumina, and a modifier comprised of about 100 to 500 wppm of Si and at least 10 wppm of one or more alkaline earth metals selected from the group consisting of Ca, Mg, Ba, and Sr, wherein the total amount of modifier does not exceed about 5000 wppm.

4,966,882

CATALYST FOR DENITRATION BY CATALYTIC REDUCTION USING AMMONIA AND A PROCESS FOR PRODUCING THE SAME

Yasuyoshi Kato; Kunihiko Konishi; Hiroshi Akama; Toshiaki Matsuda, and Nobue Teshima, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,536
Claims priority, application Japan, Jun. 5, 1987, 62-141176
Int. Cl.[5] B01J *23/28, 23/30, 23/70, 23/34*
U.S. Cl. 502—309 **6 Claims**

1. A process for producing a catalyst for denitrating by catalytic reduction using ammonia an exhaust gas discharged from an ash-circulating boiler system in which heavy metal compounds are concentrated, the process comprising the steps of:

mixing and kneading titanic acid with a metal compound selected from the group consisting of V, Cu, Fe and Mn in a water medium to form a resulting paste;

drying said resulting paste;

calcining said resulting paste to obtain a calcined material;

grinding said calcined material to obtain a catalyst powder;

contacting said catalyst powder with vapor of molybdenum oxide tungsten oxide urtin oxide to adsorb said oxide on the catalyst powder;

molding said catalyst powder to obtain a molded catalyst;

drying said molded catalyst; and

calcining said molded catalyst.

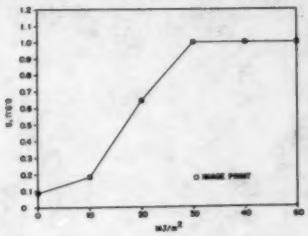
4,966,883

COMPOSITION FOR USE IN THERMALLY SENSITIVE COATINGS AND A THERMALLY SENSITIVE RECORDING MATERIAL

Nils T. Anderson, Vancouver, Wash., and Boris J. Katsen, Beaverton, Oreg., assignors to James River Graphics, Inc., South Hadley, Mass.

Filed Aug. 17, 1988, Ser. No. 232,996
Int. Cl.[5] B41M *5/18*
U.S. Cl. 503—208 **15 Claims**

1. A heat-sensitive recording material comprising a heat-sensitive color forming layer on a base; said color forming layer comprising a leuco dye, a phenolic developer, and a pseudo developer comprising diphenyl sulfone, halogenated diphenyl sulfones, or mixtures thereof, where the pseudo developer is present in an amount effective to provide for the formation of



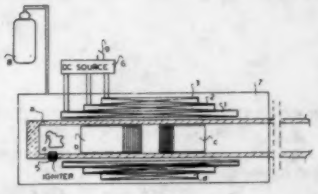
a homogeneous phase which is capable of solidifying to a single crystalline phase when the color forming layer is melted and cooled.

4,966,884

DC POWERED HYBRID COIL GUN EMPLOYING SUPERCONDUCTING ELEMENTS

Mohammed A. Hilal, Madison, Wis., assignor to International Superconductor Corp., Riverdale, N.Y.

Filed Jan. 19, 1989, Ser. No. 300,282
Int. Cl.[5] F41B *6/00*
U.S. Cl. 505—1 **18 Claims**



1. A hybrid coil gun, comprising:

a projectile formed with at least one closed-loop electromagnet winding;

a piston formed with at least one closed-loop electromagnet winding;

means defining at least one barrel receiving said projectile and from which said projectile can be electromagnetically propelled;

coil means on the barrel having at least a portion magnetically coupling to said closed-loop winding of said projectile for magnetically propelling said projectile from said barrel, said coil means comprising a closed-loop portion generating an external field and magnetically coupling to said closed-loop winding of said piston to decelerate said piston and generate by induction a current pulse for magnetically propelling said projectile; and

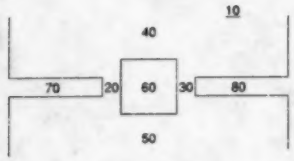
means for applying a chemical propellant to said piston to drive said piston through said closed-loop portion of said coil means and said external field, whereby said current pulse is induced, the closed-loop portion generating an external field of axially tapering field strength.

4,966,885

METHOD OF PRODUCING A DEVICE COMPRISING A METAL OXIDE SUPERCONDUCTOR LAYER

Arthur F. Hebard, Bernardsville, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 25, 1989, Ser. No. 398,797
Int. Cl.[5] H01L *39/12;* B05D *5/12*
U.S. Cl. 505—1 7 Claims



1. Method of producing an article comprising a metal oxide superconductor having a planar crystal structure, the method comprising:

(a) providing a substrate;

(b) forming a layer of the metal oxide superconductor on the substrate; and

(c) completing producing the article; CHARACTERIZED IN THAT

(d) associated with the layer of step (b) is an initial electrical thickness D, and step (c) comprises thinning the layer, removing material from the layer by exposing the layer to an ion beam, such that at least a portion of the superconducting layer attains an electrical thickness d, with $d<D$; and

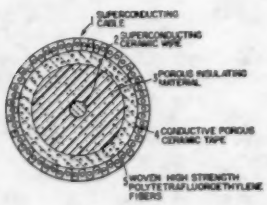
(e) associated with the ion beam is an ion energy and a beam direction, the ion energy being in the range 50 eV to 1000 eV, and the beam direction forming an angle of incidence in the range 5° to 20° with the layer surface.

4,966,886

SUPERCONDUCTING CABLE WITH CONTINUOUSLY POROUS INSULATION

Takeshi Hoshiko, Koganei, Japan, assignor to Junkosha Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 332,638
Claims priority, application Japan, Apr. 1, 1988, 63-82078
Int. Cl.[5] H01B *12/00*
U.S. Cl. 505—1 5 Claims



1. A superconducting cable comprising:

(a) a superconducting ceramic wire

(b) a porous insulating material covering said ceramic wire and

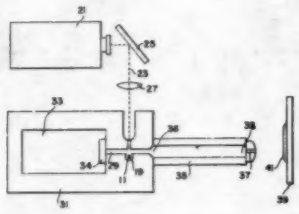
(c) a conductive porous ceramic tape covering said porous insulating material.

4,966,887

METHOD FOR THE PRODUCTION OF OXIDE SUPERCONDUCTING FILMS BY LASER ASSISTED MOLECULAR BEAM EPITAXY

James F. Garvey, Amherst, N.Y., assignor to The Research Foundation of State University of NY, Albany, N.Y.

Filed Jun. 24, 1988, Ser. No. 211,477
Int. Cl.[5] H01L *39/24;* B22F *9/04*
U.S. Cl. 505—1 11 Claims



1. A method of depositing a thin layer of superconducting material on a substrate comprising the steps of:

(a) forming at least one target comprised of metallic precursors of a superconducting oxide composition.

(b) moving said target to vaporize at least a portion of said target using a vaporization laser beam to produce a vaporized precursor of a superconducting composition.

(c) entraining said vaporized composition in a pulsed, rapidly flowing gaseous atmosphere containing at least one gas reactive with said vaporized precursor composition to form a reacted precursor of a superconducting composition,

(e) forming said reacted precursor composition into a substantially singular molecular beam, and

(f) depositing said reacted composition from said molecular beam on a substrate in the form of a thin layer.

4,966,888

HCG-HLH RECEPTOR AND HCG-HLH RECEPTOR-HCG COMPLEX AS ANTIGENS, ANTIBODIES THERETO AND CONTRACEPTIVE VACCINE

Brij B. Saxena, Englewood; Premila Rathnam, Englewood Cliffs, both of N.J., and Mukul Singh, New York, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 752,497, Jul. 8, 1985, abandoned, which is a continuation of Ser. No. 446,145, Dec. 2, 1982, abandoned.
This application Sep. 23, 1986, Ser. No. 910,554
Int. Cl.[5] A61K *37/00, 37/38, 37/29, 37/36*
U.S. Cl. 514—2 32 Claims

1. An antigen capable of being administered to a host animal to selectively induce an antibody response comprising:

(A) a first unit selected from the group consisting of

(i) human chorionic gonadotropin, and

(ii) a β-subunit of human chorionic gonadotropin, and

(B) a second unit comprising a purified receptor for human chorionic gonadotropin conjugated with said first unit, said antigen being capable of selectively inducing an antibody response to each of said first unit and second unit thereof.

4,966,889

TREATMENT OF INFLAMMATORY ARTICULAR DISEASES

Marco M. Cerinic, and Simone Marabini, both of Florence, Italy, assignors to Industria Farmaceutica Serono SpA, Rome, Italy

Filed Nov. 3, 1987, Ser. No. 116,096
Claims priority, application Italy, Nov. 4, 1986, 48617 A/86
Int. Cl.[5] A61K *37/02*
U.S. Cl. 514—11 5 Claims

1. A method of treating rheumatoid arthritis in mammals comprising the administration thereto of a composition containing somatostatin.

4,966,890

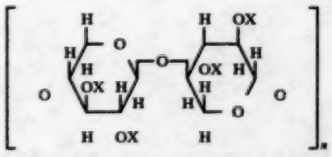
METHOD AND COMPOSITION FOR ARRESTING ANGIOGENESIS AND CAPILLARY, CELL OR MEMBRANE LEAKAGE

Larrian Gillespie, Brentwood, Calif., assignor to Angiogenics, Ltd., San Francisco, Calif.

Continuation of Ser. No. 301,346, Jan. 25, 1989, abandoned, Continuation of Ser. No. 20,859, Mar. 2, 1987, Pat. No. 4,820,693, which is a continuation-in-part of Ser. No. 865,981, May 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 848,288, Apr. 4, 1986, abandoned. This application Jun. 27, 1989, Ser. No. 371,849
The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.
Int. Cl.[5] A61K *31/70, 31/725, 31/56*
U.S. Cl. 514—25 35 Claims

1. A method of treating interstitial cystitis comprising administering a pharmaceutically effective amount of a composition comprising:

a pharmaceutically active amount of angiostatic steroid and pentosan polysulfate, or salts thereof, having the formula:



wherein X is at least one member selected from the group consisting of H and $—SO_3Y$, and Y is at least one member selected from the group consisting of H and a pharmaceutically acceptable cation.

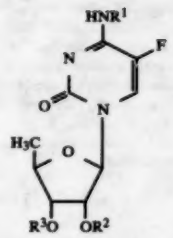
4,966,891

FLUOROCYTIDINE DERIVATIVES

Morio Fujiu, Chigasaki; Hideo Ishitsuka, Yokohama; Masanori Miwa, Kamakura; Isao Umeda, Yokohama, and Kazuteru Yokose, Urayasu, all of Japan, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 8, 1988, Ser. No. 268,437
Claims priority, application European Pat. Off., Nov. 17, 1987, 87116926.4
Int. Cl.[5] C07H *19/06*; A61K *31/505*
U.S. Cl. 514—49 7 Claims

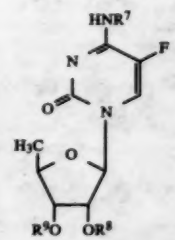
1. A compound of the formula:



(I)

wherein R^1, R^2 and R^3 are each independently hydrogen, or an easily hydrolyzable radical under physiological conditions, with the proviso that, at least one of R^1, R^2, or R^3 is an easily hydrolyzable radical under physiological conditions;
as well as hydrates or solvates of the compounds of the general formula (I).

6. A method for the manufacture of the compound of Formula I comprising reacting a compound of the formula



(II)

wherein R^7 represents hydrogen or an amino-protecting radical; R^8 and R^9 are each independently hydrogen, or a hydroxy-protecting group; or R^8 and R^9, taken together, form a cyclic hydroxy-protecting group,
with a compound of the formula

$$XCOR^4 \quad \text{(III)}$$

wherein X is a leaving radical and R^4 is hydrogen, alkyl, cycloalkyl, oxoalkyl, alkenyl, aralkyl, or aryl;
or with a compound of the formula

$$YCOR^{10} \quad \text{(IV)}$$

wherein Y is halogen and R^{10} is a radical of the formula,

$R^5ZO—$, or $R^6S—$

wherein R^5 is alkyl or aralkyl, and R^6 is alkyl or aralkyl; followed, if necessary, by removal of a protecting radical.

4,966,892

PROCESSES FOR PREPARATION OF ALOE PRODUCTS PRODUCTS PRODUCED THEREBY AND COMPOSITIONS THEREOF

Bill H. McAnalley, Grand Prairie, Tex., assignor to Carrington Laboratories, Inc., Irving, Tex.

Continuation of Ser. No. 136,193, Dec. 27, 1987, Pat. No. 4,917,890, which is a division of Ser. No. 869,991, Jun. 5, 1908, Pat. No. 4,735,935, which is a continuation-in-part of Ser. No. 810,025, Dec. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,859, Jul. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 750,321, Jun. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,967, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 375,720, May 7, 1982, abandoned. This application Jan. 24, 1989, Ser. No. 301,550

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.[5] A61K *31/751, 35/78*

U.S. Cl. 514—54 15 Claims

1. Process for making an aloe vera beverage containing a stabilized ordered linear polymer of from about 2 to about 50,000 substituted mannose monomers, wherein said mannose monomers comprise at least 80% of said polymer, comprising:

(a) washing an aloe leaf in a bacteriacidal solution to remove substantially all surface dirt and bacteria;

(b) removing at least a first end portion from said washed leaf;

(c) draining the anthraquinone-rich sap from said cut and washed leaf;

(d) removing rind and any remaining anthraquinone-rich sap from said leaf to produce a substantially anthraquinone-free aloe gel fillet;

(e) grinding said substantially anthraquinone-free aloe gel fillet;

(f) adding to said aloe juice having solubilized matter each of

(1) one or more food preservatives;

(2) citric acid; and

(3) vitamin E, to form a modified aloe vera juice; and

(g) homogenizing said modified aloe vera juice to make a beverage containing a substantially anthraquinone-free aloe gel juice having solubilized matter.

4,966,893

METHOD FOR TREATMENT OF SENILE DEMENTIA

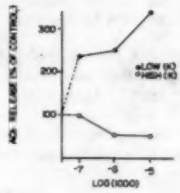
Peter K. T. Pang, 52225 Range Road 232, 205 Carriage Lane, Sherwood Park, Alberta, Canada (T8A 2A6); Lawrence C. H. Wang, 5012-144 St., Edmonton, Alberta, Canada (T6G 2E9); Christina G. Benishin, 218-53431 Range Rd 221, Androssan, Alberta, Canada (T0B 0E0), and Hsing J. Liu, 3543-105 B St., Edmonton Alta., Canada (T6J 2K9)

Filed Jan. 13, 1989, Ser. No. 297,012

Int. Cl.[5] A61K *35/78;* C07H *15/20*

U.S. Cl. 514—54 3 Claims

1. A method for alleviating the symptoms of Alzheimer senile dementia, which comprises administering to a mammal affected with Alzheimer senile dementia an amount of ginsenoside Rb_1 or of ginsenoside Rg_1 effective to increase the availability of acetylcholine in the cortical and hippocampal regions in the brain of the mammal.



4,966,894

POLYSULFATED HEPARINS FOR TREATING DISEASES CAUSED BY RETROVIRUSES

Dieter Herr, Altrip; Thomas Doerper, Bissersheim; Lothar Daum, Otterstadt; Karl-Heinz Geiss, Heuchelheim, and Achim Moeller, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 288,444

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744119

Int. Cl.[5] A61K *31/725*

U.S. Cl. 514—56 5 Claims

1. A method of treating a disease caused by a retrovirus, which comprises administering a polysulfated heparin to a patient suffering from said disease in an amount effective for inhibiting replication of said retrovirus in said patient, said polysulfate heparin having a molecular weight in the range of about 2,000–20,000 and having a sulfur content from about 13.5 to 15%.

4,966,895

CYCLIC MONOPHOSPHATES OF PURINE AND PYRIMIDINE ACYCLONUCLEOSIDES AS ANTI-RETROVIRAL AGENTS

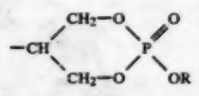
Richard L. Tolman, Warren, and Malcolm MacCoss, Freehold, both of N.J., assignors to Merck & Co. Inc., N.J.

Filed Feb. 2, 1989, Ser. No. 305,234

Int. Cl.[5] A61K *31/675*

U.S. Cl. 514—81 2 Claims

1. A method for the treatment of a mammal having acquired immuno-deficiency syndrome (AIDS) or AIDS related complex or lentivirus retroviruses, which comprises the administration to the mammal of a therapeutically effective amount, sufficient to inhibit suppression of the mammal's immune system, of a compound having the formula B—CH_2—X—Z, wherein B is guanine, X is oxygen, and Z is



an R is hydrogen or a pharmaceutically acceptable cation.

4,966,896

DERIVATIVE OF N-METHYLCARBAMATE AND INSECTICIDE CONTAINING THE SAME

Nobuo Onodera; Katsumi Nanjo; Akinori Kariya, and Kiyoshi Kanase, all of Tokorozawa, Japan, assignors to Agro-Kanesho Company, Ltd., Tokyo, Japan

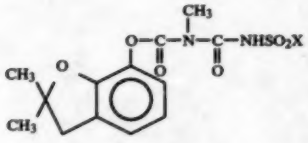
Filed Jun. 21, 1989, Ser. No. 369,527

Claims priority, application Japan, Aug. 18, 1988, 63-205607

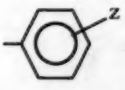
Int. Cl.[5] A01N *43/12*; C07D *307/86*

U.S. Cl. 514—469 12 Claims

1. A derivative of 2,3-dihydro-2,2-dimethylbenzofuran-7-yl N-(substituted sulfonylcarbamoyl) N-methylcarbamate represented by the general formula:

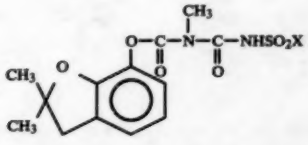


wherein X stands for a halogen atom or —NHR where R is an alkyl group, cycloalkyl group, lower alkenyl group, lower alkynyl group,

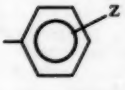


(where Z is a hydrogen atom, halogen atom, alkyl group, alkoxy group or alkoxycarbonyl group), aralkyl group, a 5-member or 6-member heterocyclic group, or an alkoxy group.

7. An insecticidal composition containing an insecticidally effective amount a derivative of 2,3-dihydro-2,2-dimethylbenzofuran-7-yl N-(substituted sulfonylcarbamoyl)-N-methylcarbamate represented by the general formula:



wherein X stands for a halogen atom or —NHR where R is an alkyl group, cycloalkyl group, lower alkenyl group, lower alkynyl group,



(where Z is a hydrogen atom, halogen atom, alkyl group, alkoxy group or alkoxycarbonyl group), aralkyl group, a 5-member or 6-member heterocyclic group, or an alkoxy group, mixed with a carrier suitable for insecticides.

4,966,897

4-SUBSTITUTED 17β-(CYCLOPROPYLOXY)ANDROST-5-EN-3β-OL AND RELATED COMPOUNDS USEFUL AS C17-20 LYASE INHIBITORS

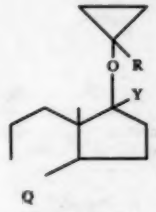
Michael R. Angelastro, Loveland, and Thomas R. Biohm, Cincinnati, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Aug. 15, 1989, Ser. No. 394,026

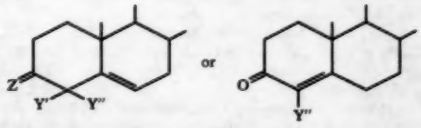
Int. Cl.[5] A61K *31/56*

U.S. Cl. 514—177 8 Claims

1. A compound of the formula:



wherein R is hydrogen or methyl; Y is hydrogen or C_1-C_4 alkyl; and Q is



wherein Z is =O, β-OH or β-OZ' wherein Z' is alkanoyl of 1–10 carbon atoms or substituted C_{2-4} alkanoyl wherein the substituent is cyclopentane or benzene; Y' is hydrogen or halogen; and Y'' is methyl or halogen.

4,966,898

4-SUBSTITUTED 17β-(CYCLOPROPYLAMINO)ANDROST-5-EN-3β-OL AND RELATED COMPOUNDS USEFUL AS C_{17-20} LYASE INHIBITORS

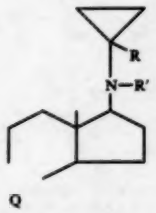
Michael R. Angelastro, Loveland, and Thomas R. Biohm, Cincinnati, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Aug. 15, 1989, Ser. No. 394,025

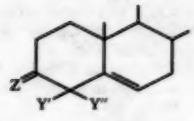
Int. Cl.[5] A61K *31/56*, *31/66*

U.S. Cl. 514—182 8 Claims

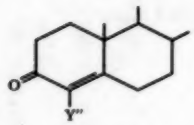
1. A compound of the formula



wherein R is hydrogen or methyl; R' is hydrogen, C_1–C_4 alkyl or cyclopropyl; and Q is



or



wherein Z is =O, β—OH or β—OZ' wherein Z' is alkanoly of 1–10 carbon atoms or substituted C_{2-4} alkanyol wherein the substitutent is cyclopentane or benzene; Y' is hydrogen or halogen; and Y'' is methyl or halogen.

4,966,899

ANTIBACTERIAL LYOPHILIZED PREPARATION OF ASPOXICILLIN

Keiichi Kohno, Toyonaka; Hiroshi Miura, Takatsuki; Yoshiyuki Hirakawa; Toshiyuki Ueki, both of Toyonaka, and Seiichi Morikuni, Onoda, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Jan. 14, 1988, Ser. No. 143,769

Claims priority, application Japan, Jan. 14, 1987, 62-06868

Int. Cl.[5] A61K *31/43*

U.S. Cl. 514—197 **7 Claims**

1. A method for preparing an antibacterial lyophilized preparation containing as an active ingredient an aspoxicillin selected from aspoxicillin anhydride and aspoxicillin trihydrate, which comprises: dissolving said aspoxicillin and an alkali metal salt of aspoxicillin in a molar ratio of 1:0.7–7 and optionally an alkali metal halide in distilled water for injection; and lyophilizing the solution.

4,966,900

CEPHALOSPORIN β-LACTAM COMPOUND AND MEDICINAL COMPOSITION

Shigeo Shimizu, and Hiroyuki Takano, both of Mukawa, Japan, assignors to Sankei Pharmaceutical Company Ltd., Tokyo and Nippon Pharmaceutical Development Institute Co., Ltd., Hokkaido, both of, Japan

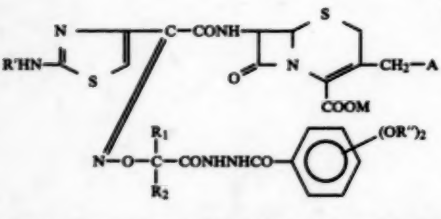
Filed Jul. 20, 1987, Ser. No. 75,412

Claims priority, application Japan, Jul. 21, 1986, 61-169860; Nov. 17, 1986, 61-273182

Int. Cl.[5] C07D *501/36*; A61K *31/545*

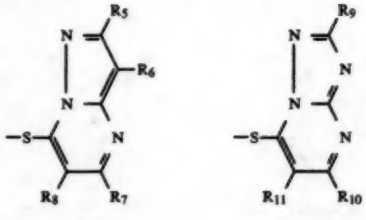
U.S. Cl. 514—206 **27 Claims**

1. A β-lactam compound represented by the formula (I):

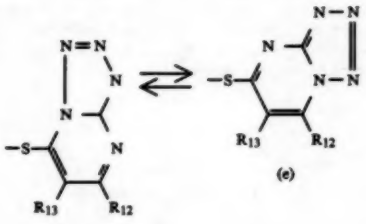


(I)

wherein R_1 and R_2 are independently a hydrogen atom or a lower alkyl group; M is a hydrogen atom, a protective group selected from the group consisting of a diphenyl methyl group, a t-butyl group, a p-nitrobenzyl group, and a trimethyl silyl group or an eliminatable group which is easily hydrolyzable in a human body selected from the group consisting of an acetoxymethyl group, an α-acetoxyethyl group, a pivaroyloxymethyl group, an α-ethoxycarbonyloxymethyl group, an α-methoxycarbonyloxymethyl group, an α-methoxycarbonyloxyethyl group, an α-ethoxycarbonyloxyethyl group, a 1-indanyl group, a phthalidyl group and a 5-methyl-2-oxo-1,3-dioxol-4-yl-methyl group; R' and R'' are independently a hydrogen atom or a protective group selected from the group consisting of acetyl group, a propionyl group, a methoxycarbonyl group and an ethoxycarbonyl group; A is group represented by the following formula (b), (c), or (d) or (e):



(b) (c)



(d) (e)

wherein R_5, R_6, R_7, R_8, R_9, R_{10}, R_{11}, R_{12} and R_{13} represent independently a hydrogen atom, a cyano group, a lower alkyl group which may be substituted by a halogen atom, a cycloalkyl group containing 3 to 6 carbon atoms or a carboxyl group which may be substituted by a protective group selected from the group consisting of a diphenyl methyl group, a t-butyl group, a p-nitrobenzyl group, and a trimethyl silyl group, or an eliminatable group which is easily hydrolyzable in a human body selected from the group consisting of an acetoxymethyl group, an α-acetoxyethyl group, a pivaroyl-oxymethyl group, an α-ethoxycarbonyloxymethyl group, an α-methoxycarbonyloxymethyl group, an α-methoxycarbonyloxyethyl group, an α-ethoxycarbonyloxyethyl group, a 1-indanyl group, a phthalidyl group and a 5-methyl-2-oxo-1,3-dioxol-4-yl-methyl group and further, R_7 and R_8, R_{10} and R_{11}, and R_{12} and R_{13} may be combined with each other, respectively, to form an alkylene group having 3 to 4 carbon atoms and its pharmaceutically acceptable salt.

4,966,901

PYRROLE DERIVATIVES, THEIR PREPARATION AND THEIR USE AS PHARMACEUTICAL ACTIVE COMPOUNDS

Gerhard Zoller, Schöneck; Rudi Beyerle, Frankfurt, and Ursula Schindler, Mörfelden-Walldorf, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

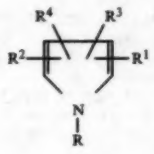
Filed May 23, 1989, Ser. No. 355,993

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1988, 3820190

Int. Cl.[5] C07D *207/335, 281/06;* A61K *31/45, 31/55*

U.S. Cl. 514—211 4 Claims

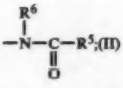
1. Pyrrole compounds of the general formula I



(I)

wherein

R is alkyl, which is substituted by —NH_2, or acylamino of the general formula II



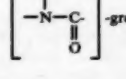
R^1 and R^2 independently of one another denote hydrogen or alkyl having 1 to 4 carbon atoms;

R^3 denotes hydrogen, alkyl having 1 to 4 carbon atoms, an amide, such as, for example, an unsubstituted amide or a mono- or dialkylamide having 1 to 3 carbon atoms per alkyl radical, an ester, such as, for example, an alkyl ester having 1 to 4 carbon atoms per alkyl radical or a benzyl ester, a nitrile group or a carboxyl group;

R^4 denotes an amide, such as, for example, an unsubstituted amide or a mono- or dialkylamide having 1 to 3 carbon atoms per alkyl radical, an ester, such as, for example, an alkyl ester having 1 to 4 carbon atoms per alkyl radical, a benzyl ester, a nitrile group a carboxyl group, nitro, alkylsulphinyl having 1 to 4 carbon atoms, phenylsulphinyl, alkylsulphonyl having 1 to 4 carbon atoms, phenylsulphonyl, alkylcarbonyl having 1 to 6 carbon atoms in the alkyl part, trifluoromethyl-carbonyl, phenylcarbonyl, dicyanomethylene, formylvinyl, alkoxycarbonylvinyl having 1 to 6 carbon atoms in the alkoxy part, or a carbonyl group which is substituted by a pyrrole radical;

R^5 denotes hydrogen, alkyl having 1 to 5 carbon atoms, phenyl, phenyl which is substituted by up to three alkoxy groups having 1 to 4 carbon atoms, a radical which is derived from 5-oxo-perhydro-1,4-thiazepine, or amino;

R^6 denotes hydrogen, it also being possible for R^5 and R^6, together with the



-group, to form a

2-pyrrolidinone-ring; and pharmaceutically acceptable salts and acid addition salts thereof.

4,966,902

HETEROCYCLIC NEOPHANE ANALOGS, PROCESSES FOR THEIR PREPARATION AND THEIR USE AS PEST-COMBATING AGENTS

Hans H. Schubert, Frankfurt am Main; Gerhard Salbeck; Hans-Peter Krause, both of Hofheim am Taunus; Walter Lüders, Heusenstamm; Werner Knauf, Eppstein/Taunus; Anna Waltersdorfer, Frankfurt am Main, and Manfred Kern, Lörzweiler, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

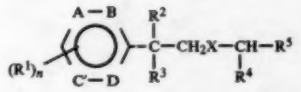
Filed Apr. 13, 1988, Ser. No. 181,705

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1987, 3712752

Int. Cl.[5] A01N *43/40;* C07D *213/62*

U.S. Cl. 514—277 6 Claims

1. A compound of formula I, and stereoisomers thereof,



(I)

wherein:

One of A, B, C′ or D is N and the remaining groups are CH

X is oxygen;

R^1 is a radical bonded to a carbon atom selected from the group consisting of H, (C_1–C_4)-alkyl, (C_2–C_4)alkenyl, (C_2–C_6)-alkynyl, (C_3–C_7)cycloalkyl, phenyl, phenoxy, (C_1–C_5)alkoxy, (C_2–C_4)alkenyloxy, (C_2–C_4)alkynyloxy, (C_1–C_4)alkylthio, (C_3–C_7)cycloalkyloxy, (C_1–C_4)halogenoalkyl, (C_1–C_4)alkoxy(C_1–C_4)alkyl, (C_1–C_3)halogenoalkoxy, (C_1–C_3)halogenoalkylthio, halogeno(C_1–C_4)alkoxy(C_1–C_4)alkyl, (C_1–C_4)alkylthio(C_1–C_4)alkyl, (C_1–C_4)alkoxy(C_1–C_4)alkoxy, halogeno(C_1–C_4)alkoxy(C_1–C_4)alkoxy, (C_2–C_4)alkenyloxy(C_1–C_4)alkoxy, halogeno(C_2–C_4)alkenyloxy, (C_1–C_4)alkoxy(C_1–C_4)alkylthio, (C_1–C_4)alkylthio(C_1–C_4)alkoxy and (C_1–C_4)alkylthio(C_1–C_4)alkylthio;

R^2 and R^3 are the same or different and each is (C_1–C_3)alkyl, (C_2–C_8)alkenyl or phenyl; or R^2 and R^3 are joined to form an alkylene chain which—together with the quaternary carbon atom to which R^2 and R^3 are attached—form an unsubstituted ring having three members;

R^4 is —H, F, —CCl_3, —C≡CH, (C_1–C_4)alkyl or —C(=S)NH_2;

R^5 is pyridyl or substituted phenyl; and

n is 1 or 2.

4,966,903

STABLE AQUEOUS SOLUTION OF VINCRISTINE SULFATE

Elie Leverd; Michel Bauer, and Serge Basquin, all of Castres, France, assignors to Pierre Fabre Medicament, Paris, France

Continuation of Ser. No. 41,407, Apr. 23, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,148

Claims priority, application France, Apr. 25, 1986, 86 06030

Int. Cl.[5] A61K *31/44*

U.S. Cl. 514—283 3 Claims

1. A stable aqueous solution of vincristine sulfate for parenteral administration, consisting essentially of

(a) an oncolytically effective amount of vincristine sulfate;

(b) 0.1% to 2.2% (w/v) of glycocoll;

(c) a 0.05M to 0.2M phosphate buffer based on monopotassium phosphate, and phosphoric acid, for fixing the pH of the solution at 4.15±0.15;

(d) an effective and pharmacologically compatible amount of an antimicrobial preservative; and

(e) water for injectable preparations.

4,966,904
SUBSTITUTED TETRAHYDROISOQUINOLINE COMPOUNDS, AND PROCESS FOR PRODUCING THEM, AND COMPOSITION CONTAINING THEM

Akihiro Tanaka, Tokyo; Takashi Fujikura, Saitama; Ryuji Tsuzuki, Tokyo; Masaki Yokota, Saitama, and Takeyuki Yatsu, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

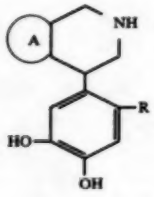
Division of Ser. No. 173,376, Mar. 25, 1988, Pat. No. 4,876,261. This application Mar. 9, 1989, Ser. No. 320,975

Claims priority, application Japan, Mar. 27, 1987, 62-75439; May 25, 1987, 62-129368; Aug. 10, 1987, 62-200562; Aug. 10, 1987, 62-200563; Sep. 9, 1987, 62-226184; Sep. 10, 1987, 62-227398; Sep. 29, 1987, 62-247590; Oct. 7, 1987, 62-254012

Int. Cl.[5] A61K *31/435;* C07D *495/04, 513/04*

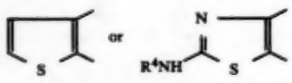
U.S. Cl. 514—301 10 Claims

1. A compound of the Formula (I):



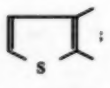
(I)

wherein (A) represents the formula



wherein

R is hydrogen or halogen and R^4 is a hydrogen atom or lower alkylsulfonyl, with the proviso that when R is hydrogen, A excludes



or

a pharmaceutically acceptable salt thereof.

4,966,905
ANTI-ULCER 5-(2-SUBSTITUTED ETHENYL)-3-(2H)-FURANONES

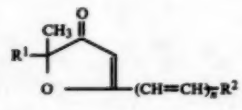
Steven W. Felman, Langhorne, Pa.; Ivo L. Jirkovsky, Plainsboro, and Kevin A. Memoli, Cranbury, both of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Dec. 12, 1989, Ser. No. 449,620

Int. Cl.[5] A61K *31/44, 31/47;* C07D *215/12, 405/06*

U.S. Cl. 514—314 13 Claims

1. A compound of the formula



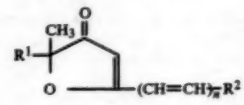
in which

R^1 is alkyl of 1 to 6 carbon atoms, phenyl or halophenyl;

R^2 is pyridinyl or quinolinyl; and

n is 1 or 2.

12. A method for preventing gastric ulcers which comprises administering, orally or parenterally, to a mammal in need thereof a cytoprotective amount of a compound of the formula:



in which

R^1 is alkyl of 1 to 6 carbon atoms, phenyl or halophenyl;

R^2 is pyridinyl or quinolinyl; and

n is 1 or 2.

4,966,906
1-ARYL-3-ISOQUINOLINECARBOXAMIDES

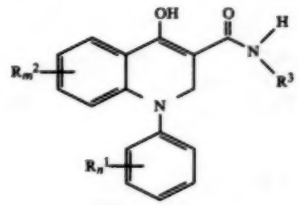
Edward J. Glamkowski, Warren, and R. Richard L. Hamer, Westfield, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 125,971, Nov. 27, 1987, Pat. No. 4,786,644. This application Jul. 14, 1988, Ser. No. 218,783

Int. Cl.[5] A61K *31/47;* C07D *214/22*

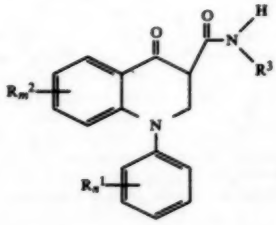
U.S. Cl. 514—309 8 Claims

1. A compound of the formula



wherein R^1 and R^2 are monovalent radicals independently selected form the group consisting of halogen, loweralkyl and loweralkoxy; R^3 is a substituted or unsubstituted monovalent radical selected from the group consisting of isoquinolyl wherein the substituents are independently selected from the group consisting of loweralkyl, loweralkoxy, and halogen; and m and n are integers independently having values of zero or 1; the optical antipodes and pharmaceutically acceptable acid addition salts thereof.

2. A compound of the formula:



wherein R^1 and R^2 are monovalent radicals independently selected from the group consisting of halogen, loweralkyl and loweralkoxy; R^3 is a substituted or unsubstituted monovalent radical selected from the group cosisting of isoquinolyl; m and n are integers independently having values of zero or 1; and the dotted line is an optional bond; the optical antipodes and pharmaceutically acceptable acid addition salts thereof.

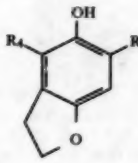
5. A method of alleviating pain comprising administering to a mammal in need of pain alleviation a pain alleviating effective amount of a compound as defined in claim 2.

4,966,907
6-SUBSTITUTED 5-HYDROXY-2,3-DIHYDROBENZOFURANS AS INHIBITORS OF LEUKOTRIENE BIOSYNTHESIS

Charles G. Caldwell, Scotch Plains; Milton L. Hammond, Somerville; Ihor E. Kopka, Newark, all of N.J.; Stanley H. B. Wright, Sawbridgeworth, Great Britain, and Robert A. Zambias, Springfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 12, 1988, Ser. No. 230,825
Int. Cl.[5] A61K *31/34, 31/44;* **C07D** *307/79, 405/12*
U.S. Cl. 514—337 **10 Claims**

1. A compound according to Formula 1 or a pharmaceutically acceptable salt thereof



(I)

wherein:
R_4 is hydrogen.
R_6 is
(a) C_{3-4} alkenyl;
(b) substituted C_{3-4} alkyl wherein the substituent is:
(1) phenylthio;
(2) pyridylmethylthio;
(3) hydroxy;
(4) cyano;
(5) phenoxy;
(6) phenylamino;
(7) hydroxy C_{1-6}alkyl phenoxy;
(8) C_{1-6} alkyl phenoxy; or
(9) halophenoxy;
(c) phenylthio;
(d) phenyl C_{1-6} alkylthio;
(e) pyridylthio;
(f) phenoxy;
(g) C_{2-4} alkoxy; or
(h) substituted C_{2-4} alkoxy wherein the substituent is:
(1) methoxy;
(2) phenyl;
(3) phenoxy;
(4) carboxy C_{1-6} alkylphenoxy, or their C_{2-4} alkyl esters; or
(5) carboxyphenoxy, or their C_{1-6} alkylesters.

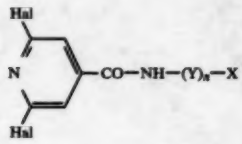
8. A method of treating leukotriene mediated diseases comprising the administration to a subject in need of such treatment a therapeutically effective amount of a compound according to claim 1.

4,966,908
ISONICOTINIC ACID AMIDES FOR PROTECTING PLANTS AGAINST DISEASE

Wolfgang Eckhardt, Lörrach, Fed. Rep. of Germany; Alfred Meyer, Basel, and Walter Kunz, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 14, 1989, Ser. No. 323,456
Claims priority, application Switzerland, Mar. 21, 1988, 1068/88
Int. Cl.[5] A01N *43/40;* **C07D** *413/12*
U.S. Cl. 514—340 **9 Claims**

1. A compound of formula I



(I)

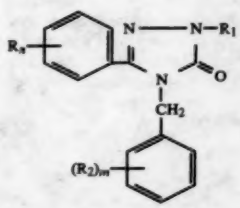
in which
Hal, each independently of the other, is fluorine, chlorine, bromine or
Y is CH-R_1 or NH;
n is 1 or 0;
R_1 is hydrogen or C_1–C_4alkyl;
X is a heterocycle selected from the group consisting of furan-2-yl, furan-3-yl, thiophen-2-yl, thiophen-3-yl, imidazol-2-yl, 4,5-imidazolin-2-yl, pyrazol-3- pyrazolin-3-yl, 1,2,4-triazol-3-yl, 1,2,4-triazol-4-yl, oxazol-2-yl, isoxazo isoxazol-3-yl, thiazol-2-yl, isothiazol-3-yl, isothiazol-5-yl, 1,3,4-thiadia 3,4-thiadiazol-3-yl, 1,3,4-oxodiazol-3-yl or 1,2,4-oxadizol-3-yl, 3-thiono-1,2-dithia-4-azol-5-yl, 2-thionothiazolin-4-on-3-yl, 1,3,4-oxy-4,5-dihydrooxazol-3-yl,
1,3,4-oxoadiazol-2-yl, 1,2,4-thiadiazol-5-yl and 1,2,4-thiadiazol-3-yl, said heterocycle being unsubstituted or substituted by C_1–C_8-alkyl, halogen, trifluoromethyl, cyano or nitro.

4,966,909
4-BENZYL-5-PHENYL-2,4-DIHYDRO-3H-1,2,4-TRIAZOL-3-ONES AND THEIR USE AS ANTICONVULSANTS

John M. Kane, Cincinnati, and Francis P. Miller, Loveland, both of Ohio, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Filed Dec. 20, 1989, Ser. No. 453,440
Int. Cl.[5] A61K *31/41*
U.S. Cl. 514—359 **7 Claims**

1. A method for the treatment of seizure disorders which comprises administering to a patient in need thereof an anticonvulsant amount of a compound of the formula



wherein
R_1 is hydrogen or C_{1-4} lower alkyl;
R and R_2 are independently C_{1-4} lower alkyl, C_{1-4} lower alkoxy, halogeno or trifluoromethyl; and
m and n are independently zero, 1 or 2;
or $(R_2)_m$ is methylenedioxy.

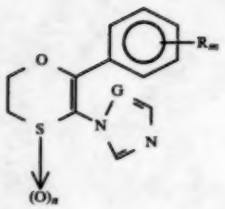
4,966,910
FUNGICIDAL OXATHIIN AZOLES

Hoi K. Lai, Guelph, Canada, and Robert A. Davis, Cheshire, Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn. and Uniroyal Chemical Ltd./Ltee, Don Mills, Canada

Filed Oct. 18, 1989, Ser. No. 423,821
Int. Cl.[5] A01N *43/653;* **C07D** *249/08*
U.S. Cl. 514—383 **6 Claims**

1. A compound of formula I

(I)



wherein:

R is each independently halogen; trifluoromethyl; C_1–C_8 alkyl; C_3–C_6 cycloalkyl; C_1–C_8 alkoxy; C_1–C_8 alkoxycarbonyl; amino; aminocarbonyl; aminosulfonyl; C_1–C_8 alkoxysulfonyl; phenyl; phenoxy; phenyl or phenoxy mono-, di- or tri-substituted independently with halogen, trifluoromethyl, C_1–C_8 alkyl or C_1–C_8 alkoxy; or benzyl;

G is N;

m is 0, 1 or 2; and

n is 0, 1 or 2.

4,966,911

IMMUNOREGULATORY AGENTS

John I. Clark; Andrew G. Farr, both of Seattle, Wash., and Stacia A. Smith, San Diego, Calif., assignors to Washington Research Foundation, Seattle, Wash.

Continuation-in-part of Ser. No. 159,357, Feb. 23, 1988, abandoned, which is a continuation of Ser. No. 6,985, Jan. 27, 1987, abandoned, which is a continuation of Ser. No. 673,534, Nov. 20, 1984, abandoned. This application Feb. 10, 1989, Ser. No. 309,446

Int. Cl.[5] A61K *31/415, 31/35, 31/205*

U.S. Cl. 514—385 **11 Claims**

1. A method of regulating the immune system of a mammalian host, comprising the step of administering to the host a compound having an immunoregulatory conformation comprising an aromatic ring associated with two atoms X_1 and X_2 selected individually from among oxygen, sulfur, and nitrogen, the immunoregulatory conformation being defined as follows:

$3.1\ \text{Å} \leq D_1 \leq 4.1\ \text{Å}$,

$2.4\ \text{Å} \leq D_2 \leq 2.8\ \text{Å}$,

$3.8\ \text{Å} \leq D_3 \leq 4.2\ \text{Å}$,

and

$35° \leq \alpha° \leq 60°$,

wherein

P_1 = the plane defined by the aromatic ring,

D_1 = the distance between the centers of plane P_1 and atom X_1,

D_2 = the distance between the centers of plane P_1 and atom X_2,

D_3 = the distance between the centers of atoms X_1 and X_2,

P_2 = the plane defined by atoms X_1 and X_2 and the center of plane P_1, and

$\alpha°$ = the angle between planes P_1 and P_2, taken at the intersection of vectors normal to each plane, and

wherein the aromatic ring is essentially planar and consists of 5 to 7 ring atoms that are cylindrically symmetrical within about 15 degrees of planar.

4,966,912

FUNGICIDAL 3-IMINO-1,4-OXATHIINS

Douglas I. Relyea, Bethany; Richard R. Regis, Torrington, and Robert A. Davis, Cheshire, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

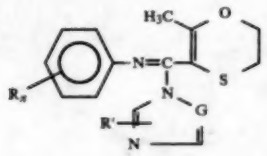
Filed Sep. 29, 1989, Ser. No. 414,968

Int. Cl.[5] C07D *327/06;* **A01N** *43/50*

U.S. Cl. 514—397 **6 Claims**

1. A compound of formula I:

(I)



wherein:

R_n is each independently C_1-C_{12} linear or branched alkyl, halogen, trihalomethyl or C_1-C_6 alkoxy;

R' is hydrogen or C_1-C_8 linear or branched alkyl;

G is CH and

n is 0,1 or 2.

4,966,913

ORGANIC NITRILES AS INSECT ANTIFEEDANTS

Richard G. Powell, Peoria, Ill.; Kenneth L. Mikolajczak, Belleair Bluff, Fla.; Bruce W. Zilkowski, Peoria, Ill.; Jon Clardy, and Ellen K. Mantus, both of Ithaca, N.Y., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C. and Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 371,879, Jun. 27, 1989. This application Apr. 3, 1990, Ser. No. 505,219

Int. Cl.[5] C07D *209/10;* **A01N** *43/38, 37/34*

U.S. Cl. 514—415 **11 Claims**

1. A method of inhibiting the feeding of insects comprising applying to said insects' food supply an effective amount of a compound of the formula:

wherein R represents alkyl and Ar represents an aromatic ring selected from the group consisting of phenyl or indolyl, in each case unsubstituted, monosubstituted, or polysubstituted by identical or different substituents selected from the group consisting of halogen, alkyl, alkoxy, and halogenated alkyl.

4,966,914

OCULOSELECTIVE BETA-BLOCKERS AS ANTIGLAUCOMA AGENTS

Ghanshyam Patil, Vernon Hills, Ill.; William L. Matier, Hockessin, Del., and Khuong H. X. Mai, Chatworth, Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

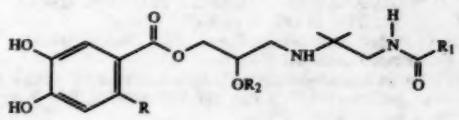
Filed Dec. 15, 1988, Ser. No. 285,007

The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.

Int. Cl.[5] A61K *31/24*

U.S. Cl. 514—461 **34 Claims**

1. A compound of the formula



wherein R is hydrogen, straight or branched loweralkyl, cycloalkyl, amino, loweralkoxy or alkanoyl amino, and R_1 l is straight or branched loweralkyl, amino, cyclohexyl, phenyl or phenyl substituted with loweralkyl, loweralkoxy or halo, benzyl, tetrahydrofuranyl, dihydrofuranyl, furanyl, R_2 is hydrogen or —COR_3 wherein R_3 is straight or branched loweralkyl, provided, however, when R_1 is loweralkyl, phenyl or cyclohexyl, R_2 is not hydrogen, or a pharmaceutically acceptable salt thereof.

4,966,915

L-DOPA DERIVATIVES OR THEIR ACID ADDITION SALTS, PROCESS FOR PRODUCING SAME AND THEIR USE

Yoshimi Tsuchiya, Funabashi; Masahiro Hayashi, Ichikawa; Hiroshi Takehana, Tokyo; Akihiro Hisaka, Ichikawa; Yoshio Sawasaki, Tokyo, and Masaki Ihara, Kawasaki, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan

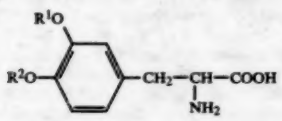
Filed Sep. 16, 1988, Ser. No. 245,348

Claims priority, application Japan, Sep. 18, 1987, 62-234299; Feb. 13, 1988, 63-31260

Int. Cl.[5] **C07C** *69/00;* **A61K** *31/215*

U.S. Cl. 514—531 **25 Claims**

1. An L-dopa derivative represented by formula [I]



[I]

wherein one of F^1 and R^2 denotes a hydrogen atom and the other denotes a group of the formula R—CO— in which R denotes a linear or branched C_1–C_{19} alkyl, C_2–C_{19} alkenyl, C_3–C_7 cycloalkyl, phenyl, C_7–C_{12} aralkyl, C_1–C_6 alkoxy or C_7–C_{12} aralkyloxy group, provided that said cycloalkyl, phenyl, aralkyl or aralkyloxy group may have one or two substituents selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy and halogen; or

a pharmaceutically acceptable acid addition salt thereof.

4,966,916

AGONISTS AND ANTAGONISTS TO NICOTINE AS SMOKING DETERRENTS

Leo G. Abood, 45 Crandon Way, Rochester, N.Y. 14618

Division of Ser. No. 14,018, Feb. 12, 1987. This application Mar. 20, 1989, Ser. No. 325,746

Int. Cl.[5] **A61K** *31/24*

U.S. Cl. 514—534 **12 Claims**

1. A composition for inhibiting tobacco smoking comprising a nicotine antagonist dispersed in inert physiologically acceptable carrier in unit dosage form containing from 1 mg to 100 mg of said nicotine antagonist per unit dose, wherein said nicotine antagonist is selected from the group consisting of dimethylaminoethyl phenylthiocarbonate, trimethylaminoethyl phenylcarbamate, dimethylaminoethyl phenylthiocarbamate and trimethylaminoethyl phenylthiocarbamate.

4,966,917

METHODS FOR IMPROVING FEED UTILIZATION AND LACTATION IN RUMINANT ANIMALS

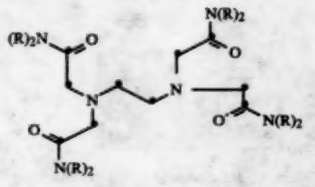
Alan W. White, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 262,374, Oct. 25, 1988, which is a division of Ser. No. 81,063, Aug. 3, 1987. This application Sep. 18, 1989, Ser. No. 408,855

Int. Cl.[5] **C07C** *103/50;* **A61K** *31/16*

U.S. Cl. 514—616 **7 Claims**

1. A composition for increasing the efficiency of feed utilization by ruminant animals comprising an effective amount of a compound of the formula:



wherein each R, independently, represents a straight or branched chain alkyl of one to six carbon atoms, or the physiologically acceptable salts thereof; and an inert carrier.

7. The compound 2,2',2'',2'''-(1,2-ethanediyldinitrilo)tetrakis-[N,N-bis(2-methylpropyl)acetamide] or the physiologically acceptable salts thereof.

4,966,918

DERIVATIVES OF CHRYSOPHANOL

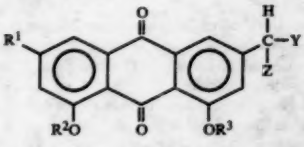
Kyoichi A. Watanabe, Rye-Brook, N.Y., and Masao Koyama, Yokohama, Japan, assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Filed Jan. 27, 1989, Ser. No. 302,836

Int. Cl.[5] **A01N** *33/10;* **C07C** *50/18*

U.S. Cl. 514—656 **10 Claims**

1. A compound having the structure:



wherein:

R^1 is hydrogen, a hydroxy group or a methoxy group;

R^2 is hydrogen or a methyl group;

R^3 is hydrogen or a methyl group;

Y is a halogen, a secondary amino group (NHalkyl) or a tertiary amino group ($N(alkyl)_2$); and

Z is hydrogen or a halogen.

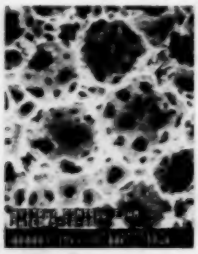
7. A pharmaceutical composition for the treatment of a malignancy in a subject comprising the compound of claim 1 or a pharmaceutically acceptable acid salt thereof and a pharmaceutically acceptable carrier, the amount of the compound or salt being 1 to 200 mg/kg of body weight of the subject.

4,966,919

COMPOSITE FOAMS

Joel M. Williams, Jr.; Alice M. Nyitray, both of Los Alamos, and Mark H. Wilkerson, Espanola, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 20, 1989, Ser. No. 368,621
Int. Cl.[5] C08J 9/40
U.S. Cl. 521—54 6 Claims



1. A method of making a composite foam comprising:

a. forming a first rigid, microcellular, open-celled selected from the group consisting of a polystyrene foam and a carbon foam having a density from about 0.015 g/cm^3 to about 0.10 g/cm^3 and a pore size of from about 1 micron to about 30 microns; and

b. filling the open cells of said first foam with a second material selected from the group consisting of a silicon aerogel foam, a resorcinol-formaldehyde foam a phloroglucinol-formaldehyde foam, or a polystyrene foam having a density of from about 0.01 g/cm^3 to about 0.60 g/cm^3.

4,966,920

SMOKE AND TOXIC GAS SUPPRESSANT COMPOSITION

James Gainer, Manchester, and Robert L. Bentley, Manchester, both of England, assignors to Ciba-Geigy Corporation, Ardsley, New York

Filed Jan. 19, 1989, Ser. No. 299,165
Claims priority, application United Kingdom, Jan. 23, 1988, 8801525
Int. Cl.[5] C08G 18/14
U.S. Cl. 521—99 23 Claims

1. A composition comprising a combustible material containing urethane linkages; and, as a smoke and toxic gas suppressant, a polyester which has an acid value below 30 mg KOH/g and which is derived from:

Ia. [A] a component which contains 4 carboxyl groups or anhydride thereof, or

Ib. a mixture of [A] and [B]:

[B] one or more components which contain 2 to 12 carboxyl groups or 1 to 6 carboxylic anhydride groups, selected from:

[B_1] an aliphatic carboxylic acid component containing 2–16 carbon atoms;

[B_2] a cyclic non-aromatic carboxylic acid containing 7–16 carbon atoms; and

[B_3] an aromatic carboxylic acid containing 8–16 carbon atoms; and

II. [C] at least one aliphatic, cycloaliphatic or aromatic polyhydroxyl component containing 2 to 8 hydroxyl groups.

4,966,921

METHOD, A COMPOUND, AND A BLOWING AGENT FOR MAKING PLASTIC FOAM

Hans Jörgen Östergaard, Egevej 1A, Lögten, DK-8541 Sködstrup, Denmark (DK-8541)

PCT No. PCT/DK88/00120, § 371 Date Jan. 16, 1990, § 102(e) Date Jan. 16, 1990, PCT Pub. No. WO89/00594, PCT Pub. Date Jan. 26, 1989
PCT Filed Jul. 14, 1988, Ser. No. 457,724
Claims priority, application Denmark, Jul. 16, 1987, 3701/87; Dec. 23, 1987, 6828/87
Int. Cl.[5] C08J 9/14
U.S. Cl. 521—131 6 Claims

1. A method of foaming a polyurethane whereby polymer forming components are mixed with a liquid blowing agent constituted by a mixture of 1,1,1 trichloroethane and difluoromonochloromethane to produce a foamed polyurethane product.

4,966,922

DUAL CURABLE SILICONE COMPOSITIONS

David C. Gross, Schenectady, and Gary M. Lucas, Scotia, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Jun. 9, 1988, Ser. No. 204,655
Int. Cl.[5] C08G 77/08
U.S. Cl. 522—25 13 Claims

1. A composition comprising

(A) a dual curable silicone polymer containing units of the formula:

$$R_AR_B^1R_C^2SiO_{(4-A-B-C)/2}$$

wherein R is hydrogen or a substituted or unsubstituted $C_{(1-18)}$ hydrocarbon; R^1 is or contains a hydrolyzable leaving group; R^2 is a $C_{(1-18)}$ epoxy functional substituted or unsubstituted hydrocarbon; "A" is 0 or 1, "B" is 1 or 2, "C" is 1 or 2 and A+B+C is 2 or 3;

(B) a catalytic amount of onium salt photocatalyst; and

(C) a catalytic amount of condensation cure catalyst;

wherein the silicone polymer is prepared by reacting in the presence of dibutylammonium formate (1) a functional silane having the formula:

$$R_AR_D^1R_C^2Si$$

wherein R is hydrogen or a substituted or unsubstituted $C_{(1-18)}$ hydrocarbon, R^1 is a hydrolyzable leaving group, R^2 is a $C_{(1-18)}$ epoxy functional hydrocarbon, A is 0 or 1, D is 2 or 3, C is 1 or 2, and A+D+C is 4; and (2) is hydroxy stopped polydiorganosiloxane of the formula:

$$HO—(R_2SiO)_x—H$$

wherein x is selected to produce a viscosity between about 10 and about 10,000,000 centipoise at 25° C. and R is hydrogen or substituted or unsubstituted $C_{(1-18)}$ hydrocarbon.

4,966,923

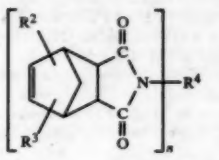
POLYMERIZABLE COMPOSITIONS

Christopher P. Banks, Saffron Walden; Edward Irving, Burwell, both of England; Alfred Renner, Muntelier, Switzerland, and Terence J. Smith, Royston, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 13, 1987, Ser. No. 120,044
Claims priority, application United Kingdom, Nov. 22, 1986, 8628003
Int. Cl.[5] C08F 2/46
U.S. Cl. 522—167 12 Claims

1. A polymerizable composition comprising a mixture of

(A) a substance having at least one allyl- or methallyl-substituted bicyclo[2.2.1]-hept-5-ene-2,3-dicarboxylic acid imide residue and having formula III



III

where

n denotes 1, 2 or 3,

R^2 denotes allyl or methallyl,

R^3 denotes a hydrogen atom or methyl group, and

when n is 1, R^4 denotes a hydrogen atom, a hydroxyl group, or an organic group selected from C_1–C_{40}-alkyl, C_1–C_{40}-alkyl interrupted in the chain by oxygen atoms, C_3–C_6-alkenyl, C_5–C_{20}-cycloalkyl, C_6–C_{20}-aryl or benzyl, any of said organic groups being substituted or unsubstituted by a hydroxyl group, or a group of formula IV

$$—Ar^1—X—Ar^2—OH \qquad IV$$

where Ar^1 and Ar^2 each denote a phenylene group and X denotes methylene, isopropylidene, —CO—, —O—, —S— —SO_2—, or

when n is 2, R^4 denotes C_2–C_{20}-alkylene, C_2–C_{20}-alkylene interrupted in the chain by oxygen atoms or secondary amino groups, C_6–C_{20}-arylene or a group of formula V

$$—Ar^1—X—Ar^2— \qquad V$$

where Ar^1, Ar^2 and X are as defined in formula IV, or

when n is 3, R^4 denotes a group of formula VI

VI

Y denotes >P=O or >P— and R denotes an alkylene group of 2 to 40 carbon atoms, C_2–C_{40}-alkylene in the chain by oxygen atoms, a m-or p-phenylene group, or a m- or p-phenyleneoxy group in which the oxygen atom is bonded to the group Y, or

Y denote >CH— and R denotes a m- or p-phenylene group, or

Y denotes $CH_3CH_2C(CH_2)_3$ or —CH_2CHCH_2— and R denotes an oxyalkylene group of 2 or 3 carbon atoms, a polyoxyethylene or polyoxypropylene group of 4 to 40 carbon atoms, or a m- or p-phenyleneoxy group in which the oxygen atom it attached to the group Y, or

Y denotes N- and R denotes an alkylene group of 2 to 10 carbon atoms, or a m- or p-phenylene group, and

(B) an acrylic material having at least one polymerizable residue of formula I

$$CH_2=C(R^1)COO— \qquad I$$

where R^1 denotes a hydrogen atom or a methyl group.

4,966,924

SOFT CONTACT LENS AND METHOD OF MANUFACTURING THE SAME

Suong-Hyu Hyon, and Yoshito Ikada, both of Uji, Japan, assignors to Biomaterials Universe, Inc., Kyoto, Japan

Division of Ser. No. 117,171, Sep. 30, 1987. This application May 15, 1989, Ser. No. 351,348

Claims priority, application Japan, Feb. 13, 1986, 61-29189

Int. Cl.[5] C08J *0/00*

U.S. Cl. 523—106 **4 Claims**

1. A soft contact lens of poly(vinyl alcohol), consisting essentially of microcrystalline poly(vinyl alcohol) crosslinked by irradiation with electron beams or radioactive rays, prepared by crystallizing a poly(vinyl alcohol) at a temperature of not more than 0° C., and having a tensile strength greater than 10kg/cm^2, a water content ranging from 40 to 95% by weight, a visible light transparency of not less than 90%, and an oxygen permeability of not less than 30×10^{-11} cm ^{3} (STP) cm/cm^2 sec mmHg.

4,966,925

ANTIFOULING ORGANOMETALLIC POLYMER RUBBER COVERINGS

Vincent J. Castelli, Severna Park, and William L. Yeager, Queen Anne, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 9, 1988, Ser. No. 204,317

Int. Cl.[5] C08K *3/20, 5/57;* C08L *11/00, 33/02*

U.S. Cl. 523—177 **27 Claims**

1. A low leaching nonpolluting marine antifouling covering formulation comprising of the blended product of the following materials and consisting essentially of, by weight:

(a) from about 44% to about 85% of elastomeric material selected rubber, and EPD (ethylene-propylene-diene) rubber,

(b) from about 7% to about 25% of selected fillers, antioxidants, accelerators, pigments, and other processing compounds, and

(c) from about 1% to about 48% of organometallic polymer containing pendant group tri-n-butyltin selected from the group consisting of poly (tri-n-butyltin methyacrylate-co-tri-n-propyltin methacrylate-co-methyl methacrylate) 1:1:1 mole ratio, poly (tri-n-butyltin methacrylate-co-methyl methacrylate) 1:1 mole ratio, tri-n-butyltin ester of poly (methyl vinyl ether-co-maleic acid) 1:1 mole ratio and tri-n-butyltin ester of poly methacrylic acid crosslinked with divinylbenzene.

4,966,926

ENCAPSULANT COMPOSITION

Paul C. Donohue, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 240,357, Aug. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 182,114, Apr. 15, 1988, abandoned. This application Aug. 11, 1989, Ser. No. 403,835

Int. Cl.[5] C08K *9/10, 3/10;* C03C *3/062, 3/108*

U.S. Cl. 523—210 **11 Claims**

1. An encapsulant composition comprising finely divided particles of a crystallizable glass consisting essentially by weight of 20–65% ZnO, 10–22% B_2O_3, 13–40% SiO_2 and 3–46% PbO dispersed in an organic medium comprising an organic polymer dissolved in organic solvent.

4,966,927

EPOXY RESIN BINDER COMPOSITIONS AND CURED PRODUCTS OBTAINED THEREFROM

James V. Hodson, 1650 East 500 South, Fruit Heights, Utah 84037

Continuation-in-part of Ser. No. 150,895, Feb. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 905,493, Sep. 10, 1986, abandoned. This application Jul. 3, 1989, Ser. No. 375,284

Int. Cl.[5] C08L *63/02;* C08K *3/36*

U.S. Cl. 523—401 **14 Claims**

1. A resinous binder composition useful for preparing improved concrete and asphaltic products comprising a mixture of (1) a polyepoxide having an epoxy equivalency greater than 1.0, and (2) a curing amount of a curing agent comprising a liquid reaction product of methylene chloride and monoethanol amine.

4,966,928

EPOXY RESIN BASED POWDER COATING COMPOSITION

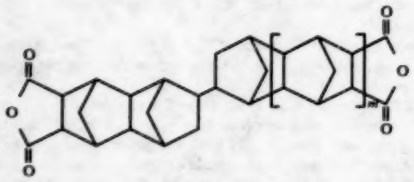
Katugi Kitagawa, Saitama; Ichiro Akutagawa, Chiba, and Kazuya Ono, Tokyo, all of Japan, assignors to Somar Corporation, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 232,989
Int. Cl.[5] C08G 59/42
U.S. Cl. 523—437 **6 Claims**

1. An epoxy resin based powder coating composition comprising

(A) 100 parts by weight of a mixed epoxy resin consisting of 60–90 wt % of a bisphenol A type solid epoxy resin and 40–10 wt % of a cresol-novolak type epoxy resin,

(B) 30–50 parts by weight of the reaction product of dicyclopentadiene and maleic anhydride represented by the following general formula:



wherein m is a positive integer,

(C) 0.1–5 parts by weight of a phenol salt of diazabicycloundecene or 2-undecyl-3-cyanoethylimidazole,

(D) 80–120 parts by weight of calcium silicate,

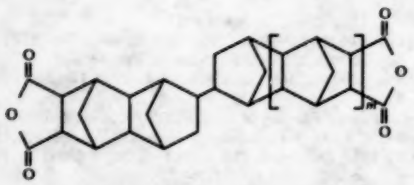
(E) 1.0–3.0 parts by weight of an acrylonitrile-butadiene copolymer, and

(F) 0.1–0.5 parts by weight of an acrylic acid ester oligomer.

2. An epoxy resin based powder coating composition comprising

(A) 100 parts by weight of a mixed epoxy resin consisting of 60 90 wt % of a bisphenol A type solid epoxy resin and 40 to 10 wt % of a cresol-novolak type epoxy resin,

(B) 10 to 60 parts of the reaction product of dicyclopentadiene and maleic anhydride represented by the following general formula:



wherein m is a positive integer, and

(C) 0.1 to 5.0 parts by weight of a cure accelerator selected from the group consisting of tertiary amines, imidazole compounds, metal compounds, amide compounds, acid anhydrides, peroxides, phenolic resins, azo compounds, cyanata compounds, isocyanate compounds and quaternary ammonium salts.

4,966,929

COMPOSITION HAVING DAMPING PROPERTY, DAMPING MEMBER, PROCESS FOR PREPARATION OF DAMPING MEMBER AND METHOD OF USING DAMPING MEMBER

Toru Tomoshige; Yasumasa Fujii; Youhei Suzuki, all of Ichihara; Kenji Yokoyama, Kawasaki, and Yoshio Iida, Yokohama, all of Japan, assignors to Mitsui Petrochemical Ind., Ltd. and NEC Environment Engineering, Ltd., both of Tokyo, Japan

Filed Jul. 18, 1989, Ser. No. 381,201
Claims priority, application Japan, Jul. 18, 1988, 63-176957
Int. Cl.[5] C08L 95/00
U.S. Cl. 524—71 **17 Claims**

1. A damping composition comprising 100 parts by weight of a petroleum resin, 100 to 500 parts by weight of asphalt and 90 to 400 parts by weight of mica, the amount incorporated of mica being smaller than the amount incorporated of asphalt, wherein the petroleum resin is selected from the group consisting of (A) isopropenyl petroleum resins obtained by polymerizing isopropenyltoluene alone and isopropenyl petroleum resins obtained by copolymerizing 100 parts by weight of isopropenyltoluene with up to 100 parts by weight of at least one fraction selected from the group consisting of fractions containing unsaturated hydrocarbon fractions having 4 and/or 5 carbon atoms (C_4 and/or C_5 fractions), obtained as by-products at refining and cracking of petroleum, (B) aromatic hydrocarbon resins obtained by polymerizing fractions having a boiling point of 140° to 280° C., which are composed mainly of aromatic unsaturated hydrocarbons having 9 carbon atoms, (C) aliphatic hydrocarbon resins obtained by polymerizing fractions having a boiling point of −10° to 20° C., which contain, as the main component, olefins and diolefins having 4 carbon atoms (C_4 fractions), or fractions having a boiling point of 15° to 60° C., which contain, as the main component, olefins and diolefins having 5 carbon atoms, resin obtained by copolymerizing mixtures of C_9 fractions with C_4 fractions, C_5 fractions and/or cyclodiolefins, resins obtained by copolymerizing vinyl aromatic hydrocarbons with C_4 and C_5 fractions, and (D) modified aromatic resins obtained by modifying said resins with an α, β-unsaturated carboxylic acid or an anhydride thereof, and resins obtained by hydrogenating said resins, isopropenyltoluene petroleum resins, and aliphatic petroleum resin.

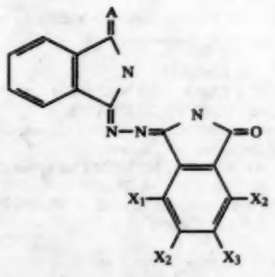
4,966,930

PROCESS FOR COLORING HIGH MOLECULAR WEIGHT ORGANIC MATERIAL WITH PIGMENTS BASED ON IMINOISOINDOLINE

Jost von der Crone, Arconciel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 1, 1988, Ser. No. 214,069
Claims priority, application Switzerland, Jul. 9, 1987, 2617/87
Int. Cl.[5] C08K 5/46, 5/37, 5/34
U.S. Cl. 524—83 **5 Claims**

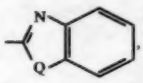
1. A composition comprising a high molecular weight organic material and an isoindoline of formula I



(I)

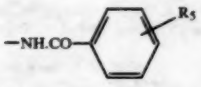
wherein A is a group of formula

wherein R is a group selected from —CONHR$_1$, —COOR$_2$ and



and

R_1 is hydrogen, C_1–C_4alkyl, phenyl or phenyl which is substituted by one or more identical or different members of the group consisting of halogen, C_1–C_4alkyl, C_1–C_4alkoxy, —COR$_3$, —NHCOR$_4$ and

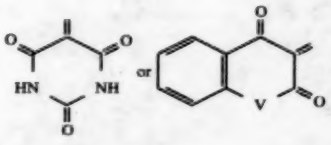


in which R_3 is C_1–C_4alkoxy, —NH$_2$ or —NHR$_4$,

R_4 is C_1–C_4alkyl and

R_5 is hydrogen, halogen or C_1–C_4alkyl, and

R_2 is C_1–C_4alkyl and Q is —NH or —S—; or A is a group of formula



wherein V is NH or O,

X_1 and X_3 are each independently of the other halogen, C_1–C_4alkoxy, C_1–C_4alkylmercapto, or phenoxy or phenylmercapto, each unsubstituted or substituted by halogen, C_1–C_4alkyl, or C_1–C_4alkoxy, and

X_2 is halogen,

wherein the amount of the compound of formula I is 0.01 to 30 weight % based on the weight of the composition.

4,966,931

FLAME-RETARDANT POLYPROPYLENE RESIN COMPOSITION

Shinichi Akitaya; Toru Fukazawa; Yutaka Nozokido, and Nobuchika Tabata, all of Chiba, Japan, assignors to Chisso Corporation, Japan

Filed Jan. 19, 1989, Ser. No. 298,951

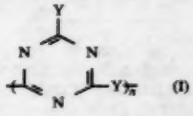
Claims priority, application Japan, Jan. 29, 1988, 63-19298; May 2, 1988, 63-109537

Int. Cl.^{5} C08K *5/349, 5/15, 5/51*

U.S. Cl. 524—100 **18 Claims**

1. A flame-retardant polypropylene resin composition which provides a flame retardance in an UL-94 vertical burning test of V-0 for a material having a wall thickness of 1/32 inch comprising:

(A)	a polyethylene resin	5 to 25% by weight
(B)	polyammonium phosphate or polyammonium phosphate modified by melamine resin	12 to 25% by weight
(C)	a 1,3,5-triazine derivative having the structure represented by the general formula (I)	at least 5% by weight



(I)

wherein X is a morpholino group or a piperidino group, Y is a divalent group of piperazine, and n is an integer of 2 to 50,

(D) a polypropylene resin remainder,

the total amount of these components (A) to (D) being 100% by weight.

4,966,932

ULTRA-HIGH SOLIDS THEIC POLYESTER ENAMELS

Charles W. McGregor, 6934 Sweethrier Dr., Fort Wayne, Ind. 46804, and James J. Connell, 8809 Lima Rd., Fort Wayne, Ind. 46818

Filed Sep. 30, 1987, Ser. No. 102,963

Int. Cl.^{5} C08L *00/00*

U.S. Cl. 524—245 **19 Claims**

1. A magnet wire enamel comprising a greater than 70% by weight solids, organic solvent solution of the reaction product at about 190° C. to about 220° C. of:

a tris(2-hydroxy-ethyl)isocyanurate polyester having a ratio of hydroxyl to carboxyl groups of 1.65 to 2.0:1 and a hydroxyl number of 216 to 316;

a modifying phenolic which is the reaction product of formaldehyde with phenol or cresols; and

a blocked polyisocyanate.

7. The enamel of claim 1 further comprising up to 0.1% by weight of a polyol flow control agent.

4,966,933

PROPYLENE POLYMER FILM

Ken-ichi Kawakami, Abiko; Masatsugi Murakami, Moriyama, and Kenji Takuwa, Takatsuki, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 279,707

Claims priority, application Japan, Aug. 2, 1988, 63-194011

Int. Cl.^{5} C08K *5/10;* **B32B** *27/32*

U.S. Cl. 524—310 **26 Claims**

1. A propylene polymer film composed of a composition comprising:

100 parts by weight of a propylene polymer,

0.01 to 0.5 parts by weight of a fine powder of a crosslinked silicone resin, wherein the average particle diameter of the fine powder is from about 1.0 to 10.0 μm, and

0.3 to 5.0 parts by weight of a hydroxy-fatty acid glyceride.

4,966,934

BIOLOGICAL COMPATIBLE ADHESIVE CONTAINING A PHOSPHOROUS ADHESION PROMOTER AND ACCELERATOR

Chin-Teh Huang, Dover, Del., and Gordon B. Blackwell, Konstanz, Fed. Rep. of Germany, assignors to Dentsply Research & Development Corp., Milford, Del.

Continuation-in-part of Ser. No. 258,304, Oct. 14, 1988, which is a continuation-in-part of Ser. No. 939,601, Dec. 9, 1986, Pat. No. 4,816,495, which is a continuation-in-part of Ser. No. 676,135, Nov. 29, 1984, Pat. No. 4,652,941. This application Jan. 21, 1989, Ser. No. 369,377

Int. Cl.^{5} C08K *5/10, 5/07, 5/05;* **C08J** *7/04*

U.S. Cl. 524—315 **8 Claims**

1. A primer composition for adhering to or coating , hard tissue comprising by weight about

(a) 6 to 20% (PENTA)
(b) an effective amount of hydroxyethyl methacrylate (HEMA)
(c) 0.01–0.5% butylated hydroxytoluene, and
(d) an inert solvent.

4,966,935

NON-FLAMMABLE POLYBUTYLENE THEREPHTHALATE COMPOSITION

Katsuhiko Takahashi, Fuji, Japan, assignor to Polyplastics Co., Ltd., Osaka, Japan

Continuation of Ser. No. 106,967, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 774,259, Sep. 10, 1985, abandoned. This application Jun. 9, 1989, Ser. No. 364,514
Claims priority, application Japan, Sep. 10, 1984, 59-189249
Int. Cl.[5] C08K *3/22*
U.S. Cl. 524—412 **7 Claims**

1. A polybutylene terephthalate composition which comprises (A) polybutylene terephthalate, (B) a flame retardant, (C) a flame-retarding assistant of antimony trioxide having an average particle size of 1–7 microns (D) polycarbonate, and (E) a reinforcing filler selected from the group consisting of glass flake, glass fiber and mica.

4,966,936

PLASTISOL COMPOSITION

Heinz A. Tomaschek, Mainz, and Helmuth Perlik, Wallhausen, both of Fed. Rep. of Germany, assignors to Dinol International Aktiebolag, Hasslebolm, Sweden

Filed Nov. 3, 1988, Ser. No. 266,845
Claims priority, application Sweden, Nov. 4, 1987, 8704307
Int. Cl.[5] C08K *3/76*
U.S. Cl. 524—425 **8 Claims**

1. A plastisol composition comprising a mixture of:
(a) polyvinyl chloride;
(b) plasticizer;
(c) calcium carbonate; and
(d) organic filler which is at least one polyolefin oligomer of an olefin monomer having 2 to 4 carbon atoms in an amount of from 0.1 to 25% by weight of the composition; wherein the polyolefin oligomer has a particle size distribution of from 5 to 20 microns; and wherein the polyolefin oligomer has a molecular weight of from 4,000 to 25,000.

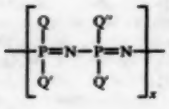
4,966,937

LOW SMOKE COATING COMPOSITIONS USING PHOSPHONITRILIC ELASTOMERIC BLENDS

Suae-Chen Chang, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

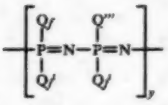
Filed May 24, 1989, Ser. No. 356,184
Int. Cl.[5] C08L *79/08, 85/02*
U.S. Cl. 524—538 **12 Claims**

1. A process for producing a low smoke coating comprising
(1) blending together a composition comprising
(a) an organic polymer fiber that is polybenzimidazole;
(b) an inorganic powder filler;
(c) a non-fluorinated linear phosphonitrilic polymer of the formula



where x is an integer from about 20 to about 50,000, Q and Q′ are the same or different and are C_1 to C_{12} linear or branched alkoxy, or substituted or unsubstituted aryloxy, and Q″ is a group having some olefinic unsaturation; and

a fluorinated linear phosphonitrilic polymer of the formula



where y is an integer from about 20 to about 50,000, Q_f and Q_f are the same or different and are fluoroalkoxy of the formula $CF_3Z(CF_2)_nCH_2O$— where n is an integer of from 1 to 20 and Z is hydrogen or fluorine and Q″, is a group having some olefinic unsaturation;
(d) an effective amount of a curing agent and, processing aid; and
(2) curing the blend.

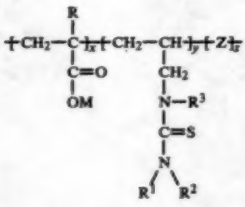
4,966,938

ALLYL THIOUREA POLYMER WITH SURFACE-MODIFYING AGENT

Samuel S. Wang, Cheshire, and D. R. Nagaraj, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 221,389, Jul. 19, 1988, Pat. No. 4,902,765. This application Nov. 8, 1989, Ser. No. 433,241
Int. Cl.[5] C08K *3/30, 3/00*
U.S. Cl. 524—555 **2 Claims**

1. A polymer composition consisting essentially of recurring units of the formula:



wherein R is hydrogen or a C_1–C_4 alkyl group, R^1 and R^2 are, individually hydrogen, a C_1–C_4 alkyl group or an aryl group, R^3 is hydrogen, a C_1–C_4 alkyl group or an aryl group, M is hydrogen, an alkali metal ammonium or C_1–C_4 alkyl ammonium, Z represents the polymerization residue of any copolymerizable monomer except an acrylamide, x represents a residual mole percent fraction, ranging from about 1.0 to about 49.0%, by weight, based on the total weight of x, y and z, z represents a mole percent fraction ranging from about 0% to about 49.0%, same basis, and the molecular weight of the polymer is between about 1,000 and about 1,000,000 and a surface-modifying agent.

4,966,939

POLYACRYLATE DISPERSIONS PREPARED WITH A WATER-SOLUBLE CONJUGATED UNSATURATED MONOMER IN THE ABSENCE OF A PROTECTIVE COLLOID

Daniel H. Craig, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jul. 11, 1986, Ser. No. 884,822
Int. Cl.[5] C08L *37/00*
U.S. Cl. 524—811 **23 Claims**

1. A process for preparing an acrylic polymer latex by the aqueous emulsion polymerization of an acrylic ester, a methacrylic ester or mixtures thereof, in the absence of a protective colloid and in the presence of a polymerization initiator, wherein the polymerization is conducted in the presence of

from about 0.1% to 2%, by weight of the total monomer, of a substantially completely water-soluble conjugated unsaturated monomer having a solubility of at least 0.4 gram per 100 ml of water at about 20° C. selected from the group consisting of furoic acid, metal salts, amine salts, ammonium salts and quaternary salts of rosin and of C_5 to C_{36} carboxylic acids, and water-soluble derivatives thereof.

4,966,940

VULCANIZED, ETHYLENE/ALPHA-OLEFIN COPOLYMER RUBBER COMPOSITION

Mitsuji Tsuji; Eiichi Usuda, both of Ichihara, and Masashi Aoshima, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 2, 1989, Ser. No. 360,451

Claims priority, application Japan, Jun. 17, 1988, 63-150944

Int. Cl.[5] C08L *51/04, 51/06, 77/00*

U.S. Cl. 525—66 **9 Claims**

1. A vulcanized, ethylene/α-olefin copolymer rubber composition obtained by static vulcanizing an unvulcanized rubber composition comprising 100 parts by weight of a rubber composition consisting of 0–99% by weight of an ethylene/α-olefin copolymer rubber and 100–1% by weight of an ethylene/α-olefin copolymer rubber containing any of an α,β-unsaturated carboxylic acid, a derivative thereof or a mixture of an α,β-unsaturated carboxylic acid and a derivative thereof; and 5–100 parts by weight of a polyamide resin, wherein an ethylene/α-olefin copolymer rubber is at least one selected from ethylene/α-olefin copolymers and ethylene/α-olefin/-non-conjugated diene copolymers.

4,966,941

NYLON COMPOSITIONS FOR BLOWMOLDING

Paliatheri M. Subramanian, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 73,224, Jul. 14, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 299,711

Int. Cl.[5] C08L *77/00*

U.S. Cl. 525—66 **3 Claims**

1. A composition consisting essentially of

(a) 90–65 parts by weight semicrystalline polyamide having a number average molecular weight between 10000 and 25000;

(b) 10–30 parts by weight of either:

(1) an ionic copolymer of at least one alpha-olefin having from 2 to 6 carbon atoms and at least one alpha, beta-unsaturated organic carboxylic acid having from 3 to 6 carbon atoms which is partially or completely neutralized with a metal cation or,

(2) a mixture of a polyethylene and a functionalized polyethylene, said functionalized polyethylene containing up to 10% by weight carboxylic acid or anhydride functional moieties; and

(c) 0.1 to 3 parts by weight of an anhydride-rich copolymer containing alternating units of maleic anhydride and an alpha-olefin selected from the group consisting of styrene, ethylene, and octadecene, which copolymer contains at least 15% by weight anhydride units and,

(d) 0.1 to 3 parts by weight of a fibrillar fluoropolymer resin.

4,966,942

POLYCARBONATE RESIN COMPOSITION WITH ACRYLIC IMPACT MODIFIERS

Ichiro Sasaki, Suita; Junji Oshima, Toyonaka, and Minoru Yamada, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jul. 13, 1988, Ser. No. 218,296

Claims priority, application Japan, Jul. 16, 1987, 62-177969

Int. Cl.[5] C08L *69/00*

U.S. Cl. 525—67 **5 Claims**

1. A polycarbonate resin composition which comprises:

50–80% by weight of a polycarbonate resin,

20–45% by weight of a poly(1,4-butylene terephthalate) resin and

5–30% by weight of an impact modifier, based on the resin composition, respectively,

the impact modifier being a core-shell polymer comprising a core composed of a cross-linked rubbery polymer of an alkyl acrylate wherein the alkyl has 2–8 carbons and a shell composed of a homopolymer or a copolymer of methyl methacrylate which has a glass transition temperature of not less than 60° C., and the core-shell polymer having an acetone soluble fraction of not more than 3% by weight based on the core-shell polymer.

4,966,943

THERMOPLASTIC MIXTURE WITH POLYFUNCTIONAL COMPOUND

Jan Bussink, Olympialaan 20, 4624 CT Bergen op Zoom, and Roelof van der Meer, Jan van Goyenstraat 21, 4625 AZ Bergen op Zoom, both of Netherlands

Continuation of Ser. No. 53,243, May 22, 1987, abandoned, which is a division of Ser. No. 786,769, Oct. 11, 1985, Pat. No. 4,668,723. This application Aug. 16, 1988, Ser. No. 232,866

Claims priority, application Netherlands, Oct. 11, 1984, 8403091

Int. Cl.[5] C08L *71/12*

U.S. Cl. 525—68 **9 Claims**

1. A thermoplastically deformable polymer composition produced by melt mixing at a temperature of 250° C.–310° C. the following constituents of

(A) a polyphenylene ether;

(B) a polyvinyl aromatic compound, and

(C) from 0.01-4% by weight of a polyfunctional conjugated diene compounds.

4,966,944

IMPACT PROPYLENE COPOLYMERS WITH IMPROVED BRUISE RESISTANCE

Webster W. Kiang, Lisle, Ill., assignor to Quantum Chemical Corporation, Cincinnati, Ohio

Continuation-in-part of Ser. No. 945,214, Dec. 10, 1986, abandoned, which is a continuation of Ser. No. 771,778, Sep. 3, 1985, abandoned. This application Oct. 25, 1988, Ser. No. 262,283

Int. Cl.[5] C08L *23/26, 23/10, 23/16, 23/20*

U.S. Cl. 525—88 **6 Claims**

1. A polymeric blend comprising:

(a) 5 to 25 wt. % of a first component selected from the group consisting of polybutene-1 and random copolymers of butene-1 and ethylene containing up to 10 mole percent ethylene; and

(b) 75 to 95 wt.% of a substantially elastomer-free second component selected from the group consisting of

(i) reactor-made intimate mixtures of propylene homopolymer and random copolymers of propylene and ethylene;

(ii) visbroken blends of reactor-made intimate mixtures of propylene homopolymer and random copolymers of propylene and ethylene, and less than 10 wt. % of said visbroken blend of an additional component selected from the group consisting of low density polyethylene, ethylene vinyl acetate copolymers, acrylate-modified polyethylene, high density polyethylene, and mixtures thereof;

(iii) block copolymers of propylene and ethylene, and

(iv) blends of propylene homopolymer and random copolymers of propylene and ethylene; wherein said second component has a flexural modulus between 100,000 and 275,000 psi and said polymeric blend has a flexural modulus greater than 90,000 psi.

4,966,945

COATING METHOD USING AQUEOUS GLYCIDYL COMPOUND-AMINE HARDNER-THERMOPLASTIC RESIN COMPOSITIONS

Manfred Drawert, Froendenberg; Horst Krase, Hamm, and Hans D. Skoda, Kamen, all of Fed. Rep. of Germany, assignors to Schering AG, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 44,606, May 1, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 272,764

Claims priority, application Fed. Rep. of Germany, May 17, 1986, 3616824

Int. Cl.[5] C08L *63/02, 79/02*

U.S. Cl. 525—113 **9 Claims**

1. A method for coating or printing a substrate, which method comprises applying to said substrate a hardenable coating or printing ink vehicle which is a solution comprising

(I) an aqueous solvent and, dissolved therein,

(II) a mixture of water soluble components comprising

(A) an aliphatic glycidyl compound having an epoxy value from 0.4 to 0.7 and more than one epoxy group per molecule;

(B) an amine component, reactive with said glycidyl compound as a hardener therefor at or slightly above room temperature, in an amount such that the ratio of epoxy groups in said glycidyl compound to amino hydrogen atoms in said amine component is from 0.5:1 to 1.5:1, said amine component being at least one member selected from the group consisting of

(1) aliphatic amines of the formula

$$H_2N—(CHR)_x—NH_2,$$

wherein R is hydrogen or alkyl having from 1 to 4 carbon atoms and x is an integer from 2 to 6,

(2) polyalkylene polyamines of the formula

$$H_2N—[(CHR)_x]_y—H,$$

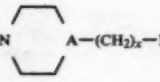
wherein R and X have the meanings given above and y is an integer from 2 to 4,

(3) polyether amines of the formula

$$H_2N—(CH_2)_n—O—(R^1—O)_z—(CH_2)_n—NH_2,$$

wherein R^1 is substituted or unsubstituted alkyl having 1 to 4 carbon atoms, z is 0, 1, 2, or 3, and n is an integer from 2 to 5,

(4) heterocyclic amines of the formula



wherein A is C or N and x is an integer from 2 to 6,

(5) an alkanolamine of the formula

$$H_2N—R^2—OH,$$

wherein R^2 is $—(CRR)_x$ and R and x have the meaning given above, or R^2 is $—(CH_2)_2—O—(CH_2)_2—$, and

(6) adducts having free amino groups and formed between

(a) an aliphatic glycidyl compound as in (A) and

(b) from 0.8 to 1.2 moles, per epoxy group of (a), of

(i) at least one of said amines (B)(1) to (B)(4), or

(ii) at least one of said amines (B)(1) to (B)(4) containing amine (B)(5) in an amount up to 50 equivalent percent; and

(C) a thermoplastic resin having free carboxyl groups which is inert at the room temperature hardening conditions or at the hardening conditions slightly above room temperature at which the epoxy compound (II)(A) is cured and which has an acid number from 40 to 200, in an amount such that there are from 1 to 10 amine groups of one or more of the amines according to (B) per carboxyl group present in (C), evaporating the solvent from said vehicle to form a film, and then maintaining said film at or slightly above room temperature to harden it.

4,966,946

BLOCK COPOLYMER OF POLYALKYLENE AND HALOGENATED POLYSTYRENE

Nicolai A. Favstritsky, Lafayette, and Rastko I. Mamuzic, W. Lafayette, both of Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Filed Feb. 2, 1990, Ser. No. 473,317

Int. Cl.[5] C08F *297/04, 297/08*

U.S. Cl. 525—314 **34 Claims**

1. A block copolymer of polyalkylene and halogenated polystyrene which comprises:

$$S'—A—(A—S')_m$$

in which m is 0, 1, 2, 3 or 4, A is a saturated polyalkylene, and S' is a nuclear brominated polystyrene having from about 0.5 to about 5 bromines per styrene unit.

4,966,947

MODIFIED CHLORINATED POLYOLEFINS

Slaton E. Fry; David W. Magouyrk; Allen J. Blankenship, all of Batesville, Ak.; Paul J. Greene, and Larry K. Johnson, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 20, 1988, Ser. No. 196,659

Int. Cl.[5] C08F *8/32*

U.S. Cl. 525—327.6 **7 Claims**

1. A method for the preparation of polycarboxylated, chlorinated polyolefins having improved properties of solvent and-/or humidity resistance, said method comprising contacting a polycarboxylated, chlorinated polyolefin having in the range of about 10 up to 40 weight percent chlorine and an acid number (expressed in terms of mg KOH/g of polymer) in the range of about 10 up to 75 with at least a stoichiometric amount (relative to the acid number of the polycarboxylated, chlorinated polyolefin) of at least one hydroxyamine having the structural formula:

$$(HO)_{3-m}(CR_2)_{3-n}—Y—NH_2$$

wherein m=0, 1 or 2; n=0, 1, 2 or 3; R is H or a hydrocarbyl radical having in the range of 1 up to 20 carbon atoms; and Y is a hydrocarbyl moiety having in the range of 1 up to 20 carbon atoms, under conditions suitable to form a hydroxyimidized, chlorinated polyolefin.

4,966,948

CARBODIIMIDE AND METAL CONTAINING EMULSION OR DISPERSION COATING COMPOSITION

E. Floyd Godbey, Jr., Louisville, Ky.; Norman G. Wolfe, New Albany, Ind., and David J. Zepka, Louisville, Ky., assignors to Akzo Coatings, Inc., Louisville, Ky.

Filed Oct. 14, 1988, Ser. No. 258,149

Int. Cl.[5] C08F *8/30, 8/42*

U.S. Cl. 525—329.9 **18 Claims**

1. A coating composition having improved cure properties comprising a blend of:

(a) about 56 to about 98.75 percent by weight solids of a carboxyl functional polymer having an acid value in the range of about 25 to about 250;

(b) about 1 to about 40 percent by weight solids of a carbodiimide; and

(c) about 0.25 to about by weight solids of a transition metal salt or a titanate, where the transition metal salt is selected from the group consisting of zinc chloride, zinc ammonium carbonate, and zirconium ammonium carbonate.

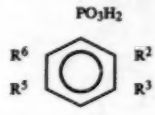
4,966,949

PROCESS FOR INCREASING THE MOLECULAR WEIGHT OF A POLYAMIDE WITH P CONTAINING CATALYST

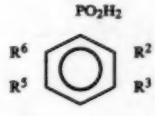
Robert C. Wheland, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 20, 1988, Ser. No. 262,936
Int. Cl.[5] C08G *69/48*
U.S. Cl. 525—420 8 Claims

1. In a process for increasing the molecular weight of a polyamide, consisting essentially of heating the polyamide in the presence of a catalyst, for a sufficient reaction time, to effect a desired increase in molecular weight, wherein the improvement consists essentially of employing, as the catalyst, at least one compound of the formulae selected from A or B:



A



B

wherein R^2, R^4, and R^6 are independently selected from the group H, R_2N—, RO—, RS—, or R—, wherein R is C_xH_{2x1} with x=1 to 10, C_6H5 or C_6H5CH_2— with the proviso that R^2, R^4 or R^6 be other than hydrogen when any two of R^2, R^4 and R^6 are H simultaneously and R^3 and R^5 are independently selected from the group H, R_2N—, RO—, RS—, or R, wherein R is C_xH_{2x+1} with x=1 to 10, C_6H_5— or $C_6H_5CH_2$— with the further proviso that when R^2, R^3, R^4, R^5, and R^6 are H or R, then at least one of R^2 or R^6 must be an R group.

4,966,950

ORIENTED POLYMERIC TAPE

Teh-Chuan Wang, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours & Co.

Continuation-in-part of Ser. No. 823,656, Jan. 29, 1986, abandoned. This application May 9, 1988, Ser. No. 165,229
Int. Cl.[5] C08L *67/02*
U.S. Cl. 525—444 7 Claims

1. An oriented polymeric tape comprising about from 90 to 50 weight percent copolyetherester and, complementally, about from 10 to 50 weight percent of polyethylene terephthalate, the tape exhibiting substantially no fraying at 20 cycles of the Fray Resistance Test.

4,966,951

HIGH STRENGTH LINEAR, LOW DENSITY POLYETHYLENE POLYMERIZATION PROCESS

Elizabeth Benham; Max P. McDaniel, and Fay W. Bailey, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 26, 1988, Ser. No. 249,740
Int. Cl.[5] C08F *2/14, 210/02*
U.S. Cl. 526—106 10 Claims

1. A slurry polymerization process comprising contacting in a reaction zone under polymerization conditions, at a temperature in the range of from about 82° to about 88° C.:

(a) a diluent selected from the group consisting of paraffins, cycloparaffins, aromatic hydrocarbons, and mixtures thereof;

(b) ethylene monomer;

(c) at least one comonomer selected from the group consisting of 1-butene, 1-pentene, 1-hexene, 1-octene, 4-methyl-1-pentene, and mixtures thereof, present in an amount in the range of from about 5 to about 20 weight percent, based on the amount of ethylene; and

(d) a trialkyl boron compound, present in an amount in the range of from about 0.5 to about 4 ppm, based on the mass of the diluent;

(e) a catalyst comprising chromium supported on a silica-titania support, wherein said support comprises from about 2 to about 10 weight percent titanium, based on the weight of the support, and wherein said catalyst has been activated in a oxygen-containing ambient and subsequently reduced in the presence of carbon monoxide in an inert ambient;

and recovering a polymer having:

(f) a density in the range of from about 0.915 to about 0.932 g/cc;

(g) a dart drop of greater than about 400 grams for 1 mil film;

(h) a HLMI/MI in the range of about 70 to about 150; and

(i) a heterogeneity index in the range of about 10 to about 20.

4,966,952

THERMOPLASTIC POLYMER COMPOSITION COMPRISING TRANS 1,4-POLYISOPRENE

John Riazza, Akron, Ohio, assignor to The Hygenic Corporation, Akron, Ohio

Continuation of Ser. No. 944,007, Dec. 22, 1986, abandoned, which is a division of Ser. No. 616,053, Jun. 1, 1984, Pat. No. 4,632,977. This application Dec. 29, 1987, Ser. No. 139,268
Int. Cl.[5] C08F *136/08;* A61K *6/08*
U.S. Cl. 526—340.2 9 Claims

1. A thermoplastic endodontic polymer composition, comprising a thermoplastic polymer selected from the group consisting of synthetic and natural trans 1,4-polyisoprene devoid of plasticizers, solvents and other processing aids, having a melt flow index exceeding at least about 10 grams per 10 minutes at 105° C.

4,966,953

LIQUID SEGMENT POLYURETHANE GEL AND COUPLERS FOR ULTRASONIC DIAGNOSTIC PROBE COMPRISING THE SAME

Yasuo Shikinami; Kaoru Tsuta; Masahiko Taniguchi, and Hidekazu Boutani, all of Osaka, Japan, assignors to Takiron Co., Ltd., Osaka, Japan

Filed May 23, 1989, Ser. No. 355,702
Claims priority, application Japan, Jun. 2, 1988, 63-135976; Nov. 11, 1988, 63-286520
Int. Cl.[5] C08G *18/10*
U.S. Cl. 528—60 6 Claims

1. A liquid segment polyurethane gel comprising segments that are liquid at room temperature which is obtained by reacting a polyol having an alkylene oxide chain which is liquid at room temperature and/or a polyurethane polyol prepolymer having an alkylene oxide chain which is liquid at room temperature with a polyurethane polyisocyanate prepolymer having an alkylene oxide chain which is liquid at room temperature.

4,966,954

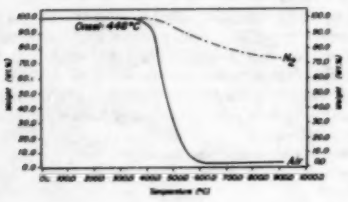
PRODUCTION AND PROCESSING OF THERMALLY STABLE POLYENAMINONITRILES AND POLYAMINOQUINOLINES THEREFROM

James A. Moore, Troy, and Douglas Robello, Webster, both of N.Y., assignors to Rensselaer Polytechnic Institute, Troy, N.Y.

Continuation-in-part of Ser. No. 21,477, Mar. 4, 1987, abandoned. This application May 23, 1988, Ser. No. 197,651
Int. Cl.[5] C08G *73/02, 73/06*
U.S. Cl. 528—125 11 Claims

1. Thermally and hydrolytically stable polyenaminonitrile polymer having a backbone comprising recurring enaminoni-

trile units which include a carbon-carbon double bond moiety in which a nitrogen atom bearing a hydrogen atom is directly attached to one carbon atom of the carbon-carbon double bond moiety and at least one nitrile group is directly attached to the other carbon atom of the carbon-carbon double bond moiety.



3. Thermally stable polyenaminonitrile having a backbone comprising recurring units containing the enaminonitrile group —C[=C(X) (CN)]—NH— in which X is hydrogen or any electron-withdrawing group.

4,966,955

AROMATIC COPOLYETHER AMIDE WHICH CAN BE PROCESSED AS A THERMOPLASTIC, PROCESS FOR ITS PREPARATION, AND ITS USE FOR THE PRODUCTION OF MOLDING

Harald Cherdron, Wiesbaden; Helmuth Deckers, Ingelheim; Friedrich Herold, Hofheim am Taunus, and Reiner Hess, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 357,527

Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818208

Int. Cl.[5] C08G *63/00, 75/00*

U.S. Cl. 528—183 **20 Claims**

1. An aromatic copolyether amide which can be processed as a thermoplastic, wherein the structure comprises recurring units of the formulae.

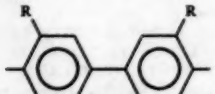
$$—CO—Ar^1—CO—, \quad (A)$$

$$—NH—Ar^1—O—Ar^1—X—AR^1—O—Ar^1—NH— \quad (B)$$

and

$$—NH—Ar^2—NH— \quad (C)$$

in which Ar^1 denotes a divalent, unsubstituted or substituted aromatic radical having 6 carbon atoms which is linked in the p-position, X represents a 2,2-propylidene link and Ar^2 is identical with Ar^1 or Ar^1 which is linked in the m-position, or is the $—Ar^1—Z—Ar^1—$ group in which Z is a direct bond, or Z represents the radical $—CH_2—$, $—C(CH_3)_2—$, —CO—, —O—, —CH=CH—, —CO—NH— or $—O—AR^1—O—$ or the radical



in which R represents hydrogen or a branched or unbranched alkyl radical having 1-4 carbon atoms, Z also represents the radical $—SO_2—$, the proportion of units (A) and of the sum of units (B) and (C) is each 100 mol-%, the proportion of units (C) being up to 50 mol-% and, when Z represents $—SO_2—$, up to 75 mol-%, and the Staudinger index of the copolyether amide is in the range from 50 to 1000 cm^3/g and the glass transition temperature is above 200° C.

4,966,956

AROMATIC THERMOTROPIC COPOLYESTERAMIDE

Enrique M. Andreu; Fernando N. Gomez; Jose L. R. Vallejo, and Jose L. S. Ostariz, all of Saragossa, Spain, assignors to Cables de Comunicaciones, S.A., Saragossa, Spain

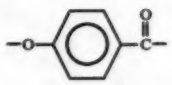
Filed Jul. 24, 1989, Ser. No. 384,277

Claims priority, application Spain, Jul. 27, 1988, 8802366

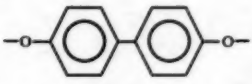
Int. Cl.[5] C08G *63/00*

U.S. Cl. 528—185 **6 Claims**

1. An aromatic thermotropic copolyesteramide consisting essentially of monomeric units (I), (II), (III), and (IV) of the following structural formulae:



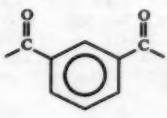
(I)



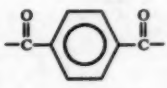
(II)

(III)

with monomeric unit IV, being a mixture of (IVa) and IVb)



(IVa)



(IVb)

with the molar proportions of (I) being within the range of from 40% to 60%, the molar proportion of (II) being within the range of from 10% to 20%, the molar proportion of (III) being within the range of from 1% to 12% and the molar proportion of (IV) being within the range of 15% to 30% with at least 7% of the total mole percent of unit (IV) being (IVa).

4,966,957

LIQUID-CRYSTALLINE, THERMOTROPIC AROMATIC POLYESTER FROM HYDROQUINONE MIXTURE

Francesco Casagrande; Marco Foá, both of Novara; Andrea Gardano, Trino, and L. Lawrence Chapoy, Lesa, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Dec. 22, 1988, Ser. No. 288,307

Claims priority, application Italy, Dec. 24, 1987, 23220 A/87

Int. Cl.[5] C08G *8/02, 63/02, 63/00*

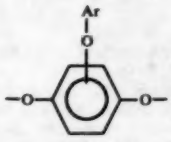
U.S. Cl. 528—193 **10 Claims**

1. A liquid-crystalline, thermotropic, aromatic containing polyester produced from the reactants:

(a) at least one aromatic or cycloaliphatic dicarboxy acid;

(b) at least one hydroquinone which is substituted by aryl having 6 to 20 carbon atoms, aralkyl having 6 to 20 carbon atoms, aroyl having 6 to 20 carbon atoms, or a combination thereof; and

(c) a hydroquinone-derivative having the formula:



(II)

wherein Ar is a simple, double or condensed aryl radical, optionally substituted with inert groups;

wherein (a) is in a substantially equimolecular ratio with respect to (b) and (c) and the molar ration of (c)/(b) is less than 1.

4,966,958

PROCESS FOR THE PREPARATION OF AROMATIC POLYESTERS

Peter Tacke; Ludwig Bottenbruch; Hans-Josef Buysch, all of Krefeld; Ulrich Grigo, Kempen, and Wolfgang Alewelt, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 3, 1989, Ser. No. 375,282

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824069

Int. Cl.[5] C08G *63/00, 63/02*

U.S. Cl. 528—271 6 Claims

1. Process for the preparation of aromatic polyesters comprising reacting at least one aromatic dicarboxylic acid dialkyl ester with at least one diester derivative of divalent phenol at temperatures from 260° to 350° C. and removing the resulting alkyl esters of the monocarboxylic acids from the reaction mixture.

4,966,959

COPOLYESTERS AND FORMULATIONS THEREOF FOR ADHESIVES

Abraham J. Cox, and Max F. Meyer, Jr., both of Kingsport, Tenn., assignors to Eastern Kodak Company

Filed Apr. 7, 1989, Ser. No. 334,429

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 20 Claims

1. A copolyester comprising

(A) an acid component comprising repeating units of

(1) 60 to 75 mol % of terephthalic acid, and

(2) 25 to 40 mol % of a dicarboxylic aliphatic or cycloaliphatic acid having from 4 to 20 carbon atoms, and

(B) a glycol component comprising repeating units of

(1) 55 to 65 mol % 1,4-butanediol, and

(2) 35 to 45 mol % of one or more other aliphatic diols having 2 to 12 carbon atoms,

wherein the total mol % of acid component and glycol component are each 100 mol %; the inherent viscosity of the copolyester is about 0.4 to about 0.6 determined at 25° C. in 60/40 (wt./wt.) phenol/tetrachloroethane at a concentration of 0.5 gram/100 ml; and said copolyester has a heat of fusion value of less than about 20 calories per gram.

4,966,960

HIGH TEMPERATURE RELEASE SHEET FOR PRINTED CIRCUIT BOARDS

Peter A. Sipos, Kingston, and Erica M. Besso, Manotick, both of Canada, assignors to Du Pont Canada Inc., Mississauga, Canada

Filed Nov. 2, 1988, Ser. No. 266,878

Claims priority, application United Kingdom, Nov. 3, 1987, 8725746

Int. Cl.[5] C08G *69/26*

U.S. Cl. 528—335 3 Claims

1. A nylon composition consisting essentially of:

(a) at least one nylon comprising polymerized dicarboxylic acid and diamine moieties;

(b) at least one inorganic particulate anti-block additive; and

(c) at least one heat stabilizer;

wherein the ratio of the viscosity of an 8.4 weight percent solution of the nylon composition at 25° C. in 90 weight percent formic acid to the viscosity of the 90 weight percent formic acid alone is at least 50.

4,966,961

POLYMALEIMIDE FROM POLYARYLENE POLYAMINE AND PROCESS FOR THE PREPARATION THEREOF

Yoshimitsu Tanabe; Keizaburo Yamaguchi; Tatsuhiro Urakami, and Akihiro Yamaguchi, all of Kanagawa, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

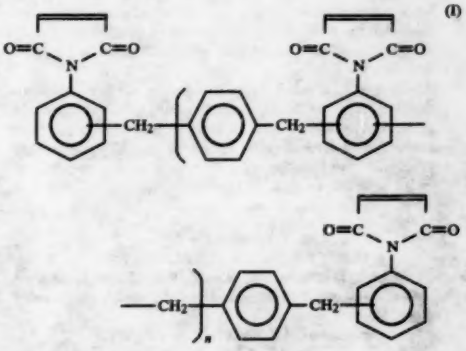
Filed May 15, 1989, Ser. No. 351,705

Claims priority, application Japan, May 19, 1988, 63-122645

Int. Cl.[5] C08G *73/12*

U.S. Cl. 528—345 17 Claims

1. A polymaleimide represented by the following formula (I):



(I)

wherein n represents an integer of from 0 to 50.

4,966,962

REVERSE ANALOGUE OF ACTINOMYCIN D

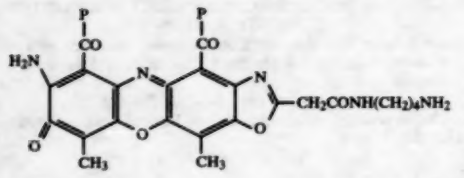
Sisir Sengupta, Needham, Mass., assignor to Trustees of Boston University, Boston, Mass.

Filed Oct. 11, 1988, Ser. No. 256,025

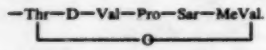
Int. Cl.[5] C07K *5/12*

U.S. Cl. 530—317 1 Claim

1. The compound having the formula:



wherein P=



4,966,963

PRODUCTION OF PROTEINS IN ACTIVE FORMS

Joseph J. Patroni, West Preston, Australia, assignor to Bunge (Australia) Pty. Ltd., Melbourne, Australia

Filed Feb. 11, 1988, Ser. No. 154,938
Claims priority, application Australia, Feb. 20, 1987, PI0462
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.
Int. Cl.[5] C07K 15/26, 3/00
U.S. Cl. 530—351 6 Claims

1. A method for the preparation of a protein in a biologically active form comprising:

solubilizing a water-insoluble protein, obtained from inclusion bodies, with an aqueous cationic surfactant to form a first protein solution, said protein being selected from the group consisting of physiologically active polypeptides, growth hormones, interferons, immunogens and lymphokines;

exchanging the solvent of the first protein solution for a biologically acceptable solvent selected from the group consisting of water, dilute aqueous solutions and buffer to form a second protein solution in which the protein refolds to its biologically active form, said biologically acceptable solvent being free of denaturants and surfactants; and

contacting said second protein solution with an aqueous mixture of a weak denaturing agent selected from the group consisting of urea, dimethylsulphone and mixtures thereof in an amount sufficient to substantially prevent the precipitation of the protein, thereby allowing the protein in the solution to maintain its biologically active form.

4,966,964

INHIBITORS OF ANGIOGENIN

Robert Shapiro, Holliston, and Bert L. Vallee, Brookline, both of Mass., assignors to President and Fellows of Harvard College, Boston, Mass.

Filed Apr. 14, 1987, Ser. No. 38,008
Int. Cl.[5] C07H 21/04
U.S. Cl. 536—27 3 Claims

1. A cloned DNA molecule comprising a nucleic acid sequence encoding the amino acid sequence

Val-Asn-Pro-Ala-Leu-Ala-Glu-Leu

2. A cloned DNA molecule comprising a nucleic acid sequence encoding the amino acid sequence

Ser-Asn-Glu-Leu-Gly-Asp-Val-Gly

3. A cloned DNA molecule comprising a nucleic acid sequence encoding the amino acid sequence

Trp-Leu-Trp-Leu-Ala-Asp

4,966,965

METHOD FOR PREPARING ALL-TRANS RETINOYL CoA

Hector F. DeLuca, Madison, Wis.; Andrzej Kutner, Warsaw, Poland, and Heinrich K. Schnoes, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Division of Ser. No. 190,443, May 5, 1988, Pat. No. 4,841,038, which is a division of Ser. No. 869,791, Jun. 2, 1986, Pat. No. 4,757,140. This application Mar. 23, 1989, Ser. No. 327,540
Int. Cl.[5] C07D 405/14
U.S. Cl. 536—27 1 Claim

1. A method for preparing all trans-retinoyl CoA which comprises condensing all trans retinoic acid with dicyclohexylcarbodiimide, separating formed dicyclohexylurea from the reaction mixture, recovering pure all-trans retinoic acid anydride, reacting the recovered anhydride with a solution of Coenzyme A and recovering all-trans-retinoyl CoA.

4,966,966

PROCESS FOR PREPARING SUCROSE FATTY ACID ESTERS

Keisuke Wada, Yokohama; Kazuhiko Onuma, Machida; Takashi Ushikubo, Yokohama, and Tsuyoshi Ito, Machida, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Japan

Filed Jan. 14, 1988, Ser. No. 144,575
Claims priority, application Japan, Jan. 17, 1987, 62-8718
Int. Cl.[5] C07H 1/00, 13/06
U.S. Cl. 536—119 4 Claims

1. A process for preparing a sucrose fatty acid ester by interesterification between sucrose and a lower alkanol ester or glyceride of a fatty acid in the presence of an ion exchange resin, wherein said ion exchange resin is a cation exchange resin having a carboxyl group having been ion-exchanged with at least one of an alkali metal and an alkaline earth metal.

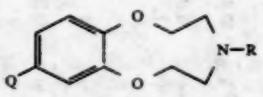
4,966,967

3,4,5,6-TETRAHYDRO-2H-1,7,4-BENZODIOXAZONINES AS CARDIOVASCULAR AGENTS

William C. Lumma, Jr., Pennsburg, Pa., and Gary B. Phillips, Wharton, N.J., assignors to Berlex Laboratories, Inc., Cedar Knolls, N.J.

Filed Sep. 15, 1989, Ser. No. 408,023
Int. Cl.[5] C07D 413/00, 413/04, 498/00
U.S. Cl. 540—568 15 Claims

1. A compound of the following Formula I

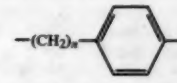


I

wherein

Q is CH_3SO_2NH— or

R is hydrogen, C_1–C_8 straight or branched chain alkyl, allyl, cycloalkyl, cycloalkylloweralkyl, phenyloweralkyl which may be substituted by up to three substituents selected from hydrogen, chlorine, bromine, fluorine, loweralkyl and loweralkoxy or



n is the integer 1,2,3 or 4 and Q_1 is CH_3SO_2NH— or

and the pharmaceutically acceptable salts thereof.

4,966,968

INDAN DERIVATIVES

Isao Hashimoto, Yamaguchi; Keiichi Yokoyama, Ichihara, and Takumi Kitahara, Yamaguchi, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

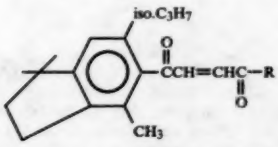
Filed Nov. 15, 1989, Ser. No. 436,805

Claims priority, application Japan, Nov. 15, 1988, 63-286706

Int. Cl.[5] C07D *295/104, 69/76, 233/11, 235/78*

U.S. Cl. 544—176 **10 Claims**

1. Indan derivatives represented by the formula (I):



(I)

wherein R is a lower alkoxy group, a phenoxy group,

whereupon R^1 and R^2 are respectively, a hydrogen atom, a lower alkyl, lower alkenyl, phenyl, or phenyl group substituted by halogen atoms, or R^1 and R^2 together with the nitrogen atom to which they are bonded form a morpholino group.

4,966,969

PROCESS FOR THE PREPARATION OF TRIETHYLENEDIAMINES

Haruhito Sato, and Masanori Tsuzuki, both of Sodegaura, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Continuation of Ser. No. 116,009, Oct. 30, 1987, abandoned. This application Feb. 14, 1990, Ser. No. 481,661

Claims priority, application Japan, Nov. 10, 1986, 61-267228

Int. Cl.[5] C07D *487/08;* **B01J** *29/28, 23/08, 21/02*

U.S. Cl. 544—352 **6 Claims**

1. A process for preparing triethylenediamines which comprises contacting an amine compound selected from the groups consisting of monoethanolamine, piperazine, ethylenediamine and N-aminoethylpiperazine with a catalyst comprising crystalline metallosilicate having a silica (SiO_2)/metal oxide (M_2O_3) molar ratio of 12/1 or more under a pressure of not less than 4 kg/cm^2 (absolute pressure), said M is at least one metal selected from the group consisting of gallium and boron.

4,966,970

PROCESS FOR MANUFACTURING PYRAZINES

Young K. Lee; Sang-Eon Park, and Young S. Kwon, all of Daejon-si, Rep. of Korea, assignors to Korea Research Institute of Chemical Technology, Rep. of Korea

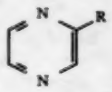
Filed Dec. 29, 1988, Ser. No. 291,455

Claims priority, application Rep. of Korea, Dec. 31, 1987, 15641

Int. Cl.[5] C07D *241/12*

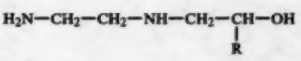
U.S. Cl. 544—410 **3 Claims**

1. A process for manufacturing pyrazines having the formula



(I)

from N-(2-alkylhydroxy)ethylenediamines having the formula



(II)

where R is H, methyl or ethyl, by passing said diamines in a hydrogen-containing stream, at reaction temperatures of from about 300° to about 450° C., over a copper-chromite catalyst reduced with a hydrogen-containing stream at temperatures of from 300° to 450° C.

4,966,971

METHOD FOR PREPARING 1-CHLORO-5-ALKYLISOQUINOLINES CONDENSED WITH AROMATIC GROUPS

Emile R. B. Bisagni, Orsay, and Marilys Greletépouse Rautureau, Palaiseau, both of France, assignors to Centre National de la Recherche Scientifique (C.N.R.S.), Paris, France

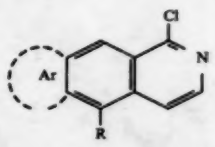
Filed Nov. 14, 1988, Ser. No. 270,272

Claims priority, application France, Nov. 16, 1987, 87 15791

Int. Cl.[5] C07D *221/08, 221/18, 471/14, 495/04*

U.S. Cl. 546—64 **9 Claims**

1. A method for preparing a compound represented by the formula (I) below:



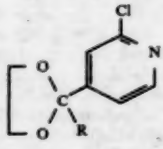
I

where:

R denotes a C_1 to C_3 alkyl group; and

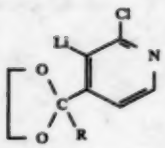
Ar denotes a mono- or polycyclic, aromatic or heteroaromatic group, optionally substituted, which method comprises the stages consisting in:

(a) performing a lithiation by reaction of lithium diisopropylamide with the compound of formula (II)



(II)

where R is as defined above, to form the compound of formula III

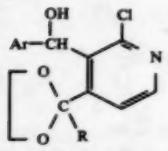


(III)

(b) reacting an aldehyde of formula IV

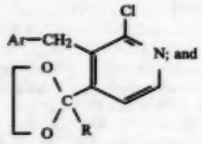
ArCHO IV

where Ar is as defined above, with a solution of the abovementioned compound of formula (III) leading to the secondary alcohol of formula (V)



(V)

(c) the secondary alcohol of formula (V) is reacted with triethylsilane to reduce the secondary alcohol group to a methylene group, leading to the compound of formula (VI)



(VI)

(d) the compound of formula (VI) is subjected to an acid hydrolysis leading to the compound of formula (I).

4,966,972

PROCESS AND CATALYST FOR THE PREPARATION OF 2,2'-BIPYRIDYLS

Gerald L. Goe, Greenwood; Charles K. McGill, Indianapolis, and Angela R. Sherman, Lebanon, all of Ind., assignors to Reilly Industries, Inc., Indianapolis, Ind.

Filed Jan. 19, 1989, Ser. No. 299,789

Int. Cl.[5] C07D *213/22*

U.S. Cl. 546—260 **28 Claims**

1. A process for the preparation of 2,2'-bipyridyls, comprising the step of reacting a pyridine base in the presence of a nickel catalyst which comprises a significant amount of elemental nickel bound on a suitable support, said reacting being at a temperature of about 200°–240° C. and a pressure sufficient to maintain at least some of the base in a liquid state during said reacting.

4,966,973

2-SUBSTITUTED COUMARAN DERIVATIVES

Giichi Goto; Shigenori Ohkawa, both of Osaka, and Naohisa Fukuda, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

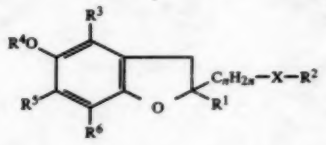
Filed Jun. 9, 1989, Ser. No. 363,787

Claims priority, application Japan, Jun. 10, 1988, 63-143860

Int. Cl.[5] C07D *307/79*

U.S. Cl. 546—269 **5 Claims**

1. A compound of the formula:



wherein R^1 is hydrogen or C_{1-6} alkyl; n is 1; X is sulfide, sulfoxide of sulfone; R^2 is C_{1-10} alkyl, C_{2-10} alkenyl, C_{2-10} alkynyl, C_{3-7} cycloalkyl, C_{3-7} cycloalkenyl, phenyl, naphthyl, C_{1-3} alkylphenyl, C_{1-3} alkylinaphthyl, thienyl, pyridyl, imidazolyl, thiazolyl, pyrrolyl, pieridyl, hexamethyleneimidyl, quinolyl, quinuclidyl, indolyl or primidyl, which may be substituted by hydroxy, carboxy, C_{1-3} alkoxycarbonyl, amino, nitro, cyano, halogen C_{1-3} alkoxy, C_{1-3} alkyl, phenyl, C_{3-6} cycloalkyl or pyridyl; R^3 is C_{1-6} alkyl; R^4 is hydrogen or C_{1-10} alkanoyl; and R^5 and R^6 each is C_{1-6} alkyl, or a physiologically acceptable salt thereof.

4,966,974

2-PHENYLSULPHINYL-NITRO-PYRIDINES, AND THEIR USE AS FUNGICIDES

Alexander Klausener, Stolberg; Wilfried Paulus; Hans-Georg Schmitt, both of Krefeld, and Wilhelm Brandes, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

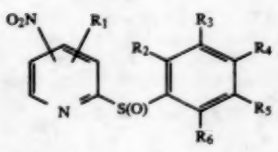
Filed Apr. 3, 1989, Ser. No. 332,853

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1988, 3812177

Int. Cl.[5] C07D *213/61, 213/62, 213/72*; A01N *43/40*

U.S. Cl. 546—294 **3 Claims**

1. A 2-phenylsulphinyl-nitro-pyridine of the formula



in which

R_1 is hydrogen and

R_2, R_3, R_4, R_5, and R_6 independently of one another are hydrogen, halogen, C_1-C_4-alkyl, trifluoromethyl, C_1-C_3-alkoxy, cyano or nitro.

4,966,975

PROCESSES FOR THE PREPARATION OF NOVEL NAPHTHALENYLMETHYL-3H-1,2,3,5-OXATHIADIAZOLE 2-OXIDES USEFUL AS ANTIHYPERGLYCEMIC AGENTS

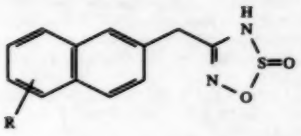
John W. Ellingboe; Jehan F. Bagli, both of Princeton, and Thomas R. Alessi, Monmouth Junction, all of N.J., assignors to American Home Product

Filed Apr. 21, 1989, Ser. No. 341,615

Int. Cl.[5] C07D *291/04*

U.S. Cl. 548—122 **3 Claims**

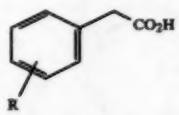
1. The process for producing compounds of formula (I)



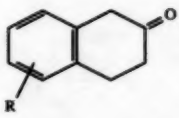
(I)

wherein R is hydrogen, lower alkyl containing 1 to 6 carbon atoms, alkoxy containing 1 to 6 carbon atoms, or halogen, and the pharmaceutically acceptable salts thereof which comprises

(a) reacting the phenylacetic acid of structure

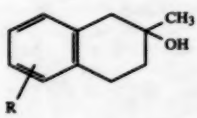


wherein R is as defined above with thionyl chloride to produce the corresponding acid chloride; and reacting said acid chloride with a Lewis acid selected from the group consisting of titanium tetrachloride and aluminum trichloride and ethylene to produce the 2-tetralone of structure



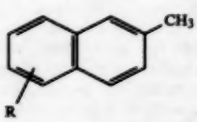
wherein R is as defined above; and

(b) reacting said 2-tetralone with an organometallic species selected from the group consisting of methyl magnesium iodide, methyl cerium dichloride and methyl titanium trichloride to produce the tetrahydronaphthol of structure



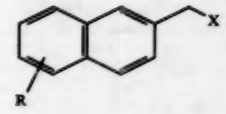
wherein R is as defined above; and

(c) reacting said tetrahydronaphthol with trityl alcohol in trifluoroacetic acid or tritylfluoroborate to produce the 2-methylnaphthalene of structure



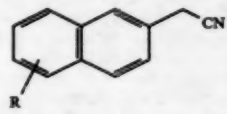
wherein R is as defined above; and

(d) reacting said 2-methylnaphthalene with N-bromosuccinimide or N-chlorosuccinimide to produce the 2-halomethylnaphthalene of structure



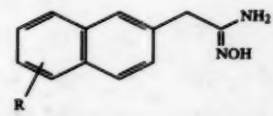
wherein R is as defined above and X is bromine or chlorine; and

(e) reacting said 2-halomethylnaphthalene with lithium cyanide, sodium cyanide or potassium cyanide to produce the nitrile of structure



wherein R is as defined above; and

(f) reacting said nitrile with hydroxylamine to produce the imidamide of structure



wherein R is as defined above; and

(g) reacting said imidamide with thionyl chloride.

4,966,976

ISOMERIZATION PROCESS

Raymond V. H. Jones, West Lothian, Scotland, assignor to Imperial Chemical Industries plc, London, England

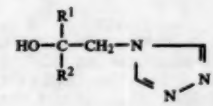
Filed Jan. 24, 1989, Ser. No. 301,020

Claims priority, application United Kingdom, Jan. 26, 1988, 8801669

Int. Cl.[5] *C07D 249/08*

U.S. Cl. 548—267.8 **8 Claims**

1. A process for transforming a 4H-substituted-1,2,4-triazole of the general formula (I):



(I)

in which R^1 is C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, phenyl or substituted phenyl, and R^2 is phenyl or substituted phenyl, the phenyl substituents being selected from one or more of halogen, C_{1-4} alkyl, trifluorometnyl, C_{1-4} alkoxy, nitro and phenoxy, into the isometric 1H-substituted-1,2,4-triazole, which comprises heating the triazole of formula (I) at a temperature of from 150° C. to 300° C. in the presence of a base and, essentially, in the absence of a polar, aprotic solvent.

4,966,977

PROCESS FOR THE PREPARATION OF INDIGO COMPOUNDS

Usaji Takaki, Fujisawa; Shinobu Aoki, Yokohama; Yoshihiro Yamamoto, Yokohama, and Isao Hara, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,503

Claims priority, application Japan, Mar. 17, 1988, 63-062010; Apr. 6, 1988, 63-083043

Int. Cl.[5] C07D *403/04*

U.S. Cl. 548—457 16 Claims

1. In a process for preparing an indigo compound wherein an indole compound is oxidized to produce the indigo compound, the improvement wherein the indole is unsubstituted at the 2- and 3- positions and is oxidized with 0.01 to 100 moles of hydrogen peroxide per mole of the indole compound at a temperature of from −10° to 140° for up to 50 hours, either a) as a solution in an organic solvent or b) in a liquid phase having at least a separate organic phase containing the indole compound and an aqueous phase containing the hydrogen peroxide, thereby forming the indigo compound.

4,966,978

PROCESS FOR SEPARATING INDOLE IN REFINED FORM

Yoshiki Sato; Yoshitaka Yamamoto, both of Tsukuba; Yutaka Mito, Ibaraki, and Harumasa Tanabe, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jun. 8, 1989, Ser. No. 363,084

Claims priority, application Japan, Jun. 8, 1988, 63-140730

Int. Cl.[5] C07D *209/08*

U.S. Cl. 548—469 3 Claims

1. A process for separating indole in refined form, by feeding a mixture containing more than 50 wt % of indole to a high pressure vessel, pressurizing said mixture in said high pressure vessel to crystallize indole, conducting solid-liquid separation continuously in pressurized state, and removing solid indole of a purity of more than about 99% from said high pressure vessel, characterized in that:

a pressure of 700–2500 atms is applied for crystallization of indole in said high pressure vessel; and the operating temperature of said solid-liquid separation is in the range of 50°–65° C.

4,966,979

PROCESS FOR SYNTHESIS OF AZETIDINE AND NOVEL INTERMEDIATES THEREFOR

Young S. Lo; Dwight A. Shamblee; David H. Causey, all of Richmond, and Richard P. Mays, Ashland, all of Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Division of Ser. No. 7,596, Jan. 28, 1987, Pat. No. 4,870,189.

This application Apr. 24, 1989, Ser. No. 341,994

Int. Cl.[5] C07D *205/00*

U.S. Cl. 548—950 2 Claims

1. A process for the preparation of N-benzhydrylazetidine which is comprised of heating benzhydrylamine and a 1-bromo-3-chloropropane in admixture with butanol, and at least 1 mole of water per mole of potassium carbonate to give a solution comprised of benzhydrylazetidine and butanol.

4,966,980

PROCESS FOR PRODUCING AZIRIDINES

Teruo Kamei, Yokohama; Yuuji Shimasaki, Takatsuki; Hideaki Tsuneki, Suita; Koichi Yamamoto, Tokyo; Yutaka Morimoto, Yokohama, and Michio Ueshima, Takarazuka, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co. Ltd., Osaka, Japan

PCT No. PCT/JP88/00262, § 371 Date Nov. 7, 1988, § 102(e) Date Nov. 7, 1988, PCT Pub. No. WO88/07038, PCT Pub. Date Sep. 22, 1988

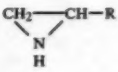
PCT Filed Mar. 12, 1988, Ser. No. 275,106

Claims priority, application Japan, Mar. 12, 1987, 62-55393; Mar. 12, 1987, 62-55394; Mar. 12, 1987, 62-55395; Jun. 25, 1987, 62-156617; Jul. 13, 1987, 62-172989; Oct. 9, 1987, 62-253868; Oct. 22, 1987, 62-265443

Int. Cl.[5] C07D *203/02*

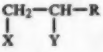
U.S. Cl. 548—954 25 Claims

1. A process for producing an aziridine compound represented by the following general formula



(II)

wherein R represents hydrogen, or methyl or ethyl group, which comprises intramolecularly dehydrating an alkanolamine represented by the following formula



(I)

wherein R is as defined, X is OH or NH_2, and Y is NH_2 when X is OH, and OH when X is NH_2, in the presence of an intramolecular dehydration catalyst in the vapor phase in a reaction step (A) to form a reaction product containing the aziridine compound, by-product carbonyl compound and water, and subjecting the reaction product to any one of the following procedures (1) to (3),

(1) sending the reaction product to a recovery step (B) and recovering the aziridine compound in the presence of at least 0.1 mole per unit time per mole of the aziridine compound in the reaction product and at least 1 mole per mole of carbonyl compound in the reaction product an absorbing liquid comprising of a primary or secondary amine compound,

(2) sending the reaction product to a distillation step (C) and distilling the aziridine compound in the presence of at least 0.05 mole per mole of the axiridine compound fed into the distillation system, at least 1 mole per mole of the carbonyl compound and at least 1 mole per mole of water, of a primary or secondary amine compound, and

(3) sending the reaction product to the recovery step (B), recovering the axiridine compound int he presence of at least 0.1 mole per unit time per mole of the aziridine compound in the reaction product and at least 1 mole per mole of the carbonyl compound, of an absorbing liquid comprising a primary or secondary amine compound, sending the recovered axiridine compound to the distillation step (C) and distilling it in the presence of a primary or secondary amine compound in an amount of at least 0.05 mole per mole of the axiridine compound fed into the distillation system, at least 1 mole per mole of the carbonyl compound and at least mole per mole of water.

4,966,981

PROCESS FOR PREPARING EPOXY GROUP-CONTAINING SILANES

Haruko Takai, Chiba; Taiji Sakiyama, Urayasu; Kimishige Matsuzaki, Yokohama; Toshio Nozaki, Kamakura; Yoshiharu Okumura, Shinjuku, and Chihiro Imai, Yokohama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 184,612, Apr. 21, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 490,540

Claims priority, application Japan, Apr. 22, 1987, 62-98883

Int. Cl.[5] C07D 303/22

U.S. Cl. 549—215 4 Claims

1. In a process for the preparation of epoxy group-containing alkoxy silanes by hydrosililation of a terminally unsaturated epoxy compound with a hydro-alkoxy silane using a platinum catalyst, the improvement which comprises carrying out the hydrosilylation in the presence of an alcohol in an amount of from 0.2 to 10 moles, per mole of the hydro-alkoxy silane, said alcohol being selected from the group consisting of methanol, ethanol, n-propanol and isopropanol.

4,966,982

PROCESS FOR THE PRODUCTION OF LACTIDE

Hiroshi Ono, Fujisawa, and Heng Phala, Yokohama, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 343,448

Claims priority, application Japan, Apr. 27, 1988, 63-102756

Int. Cl.[5] C07D 319/10

U.S. Cl. 549—274 13 Claims

1. A process for the formation of a lactide, comprising the step of heating an alkali metal or alkaline earth metal salt of a 2-halopropionic acid in a non-aqueous solvent which has a low boiling point, which has a high solubility for the lactide and which has a low solubility for alkali metal or alkaline earth metal halides, at a reaction temperature of 100° to 250° C. and in the vicinity of a pressure produced by the solvent itself at the reaction temperature to convert the salt into the lactide.

4,966,983

BENZOPYRANS FOR USE IN RECORDING SYSTEMS

Andreas Guentner; Udo Mayer, both of Frankenthal, and Andreas Oberlinner, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshaften, Fed. Rep. of Germany

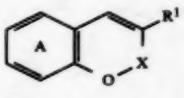
Division of Ser. No. 25,063, Mar. 12, 1987, Pat. No. 4,841,050. This application Mar. 16, 1989, Ser. No. 323,995

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608215

Int. Cl.[5] C07D 311/58, 311/92

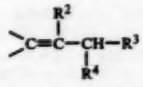
U.S. Cl. 549—389 16 Claims

1. A benzopyran of the formula I:



(I)

wherein R^1 is C_{11}–C_8-alkyl, phenyl, phenyl substituted with C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen, C_1–C_5-alkoxy or halogen, X is a radical



wherein R^2 is hydrogen, R^3 is phenyl, phenyl substituted by C_1–C_4-alkyl, C_1–C_4-alkyl substituted by phenyl, cyclohexyl, halogen, C_1–C_8-alkoxy, C_1–C_8-monoalkylamino, C_1–C_8-monoalkylamino substituted by phenyl or chlorine, C_1–C_8-dialkylamino, C_1–C_8-dialkylamino substituted by phenyl or chlorine, phenylamino, phenylamino substituted on the phenyl ring or on the nitrogen atom by C_1–C_8-alkyl, naphthyl or naphthyl substituted by C_1–C_4-alkoxy; and R^4 is hydroxyl, C_1–C_5-alkoxy, phenoxy, phenoxy substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen, phenylsulfonyl, phenylsulfonyl substituted by C_1–C_4-alkyl or halogen or the radical —CHYZ, wherein Y and Z are identical or different and independently of one another are each acetyl, benzoyl, C_1–C_5-alkoxycarbonyl or cyano, and where when Y is cyano, Z may also be methyl; ring A is unfused or fused to a benzo ring, wherein ring A is unsubstituted or substituted by C_1–C_4-alkyl, chlorine or bromine or substituted in ring position 7 by C_1–C_5-monoalkylamino, C_1–C_5-dialkylamino, C_1–C_5-monoalkylamino substituted by chlorine or phenyl, C_1–C_5-dialkylamino substituted by chlorine or phenyl, hydroxyl or C_1–C_4-alkoxy.

4,966,984

PROCESS FOR THE CYCLIZATION OF ORTHOBENZOYLBENZOIC ACID

Michel Devic, Sainte Foy les Lyon, France, assignor to Atochem, France

Continuation of Ser. No. 605,817, May 11, 1984. This application Nov. 8, 1989, Ser. No. 433,365

Claims priority, application France, May 3, 1983, 83 07319; Jul. 5, 1983, 83 11150

Int. Cl.[5] C07C 50/18

U.S. Cl. 552—208 6 Claims

1. A process for the cyclization of orthobenzoylbenzoic acid to anthraquinone comprising first mixing or layering solid orthobenzoylbenzoic acid and a solid superactive bleaching earth, said mixture or layer being of a thickness such that anthraquinone formed and sublimated diffuses totally therefrom, heating said mixture of solids or layer of solids without agitation at atmospheric pressure and at a temperature between about 300° C. and 400° C.; said solid superactive bleaching earth being a clay of the bentonite type which has been subjected to the reaction of a mineral acid, washed with water such that the acid content thereof, expressed as hydrochloric acid, does not exceed 0.1%, for about 5 to 120 minutes to cyclize substantially all of said acid to anthraquinone.

4,966,985

OPTICALLY ACTIVE CARBOALKYLATED AMINO ALCOHOLS AND THEIR UTILIZATION IN OPTICAL RESOLUTION

Masaki Hasegawa, Tokyo; Kazuhiko Saigo, Souka; Yoichi Yuki, and Kouzou Tachibana, both of Himeji, all of Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

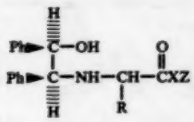
Filed Dec. 24, 1986, Ser. No. 946,460

Claims priority, application Japan, Dec. 27, 1985, 60-293883; Dec. 27, 1985, 60-293884

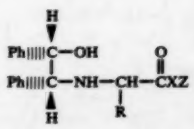
Int. Cl.[5] C07F 1/08, 3/06, 15/02; C07C 327/00

U.S. Cl. 556—116 2 Claims

1. An optically active carboalkylated amino alcohol isomer having one of the formulae (1-1), (1-2), (1-3) and (1-4):

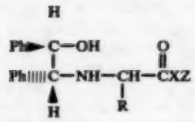


(1-1)

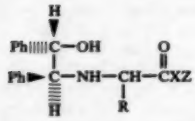


(1-2)

-continued



(1-3)



(1-4)

in which Ph is phenyl, R is hydrogen, an alkyl having 1 to 10 carbon atoms or an aryl having 6 to 10 carbon atoms, X is [a group of] —O— or —S—, and Z is hydrogen, an alkyl having 1 to 10 carbon atoms or a metal element selected from the group consisting of copper iron, zinc, nickel, cobalt, magnesium, calcium, sodium or potassium.

4,966,986

METHOD FOR PREPARING ORGANOHALOSILANES

Roland L. Halm, Madison, Ind., and Regie H. Zapp, Carrollton, Ky., assignors to Dow Corning Corporation, Midland, Mich.

Filed Aug. 3, 1989, Ser. No. 389,135

Int. Cl.[5] C07F 7/16

U.S. Cl. 556—473 **11 Claims**

1. In a method for increasing the yield of methyldichlorosilane produced during the preparation of methylchlorosilanes by the addition of methyl chloride to a reactor containing a reaction mass comprising silicon metal and a suitable catalyst at a temperature of from 250 to about 350° C., the improvement comprising homogeneously blending at least the initial portion of the methyl chloride with an amount of hydrogen chloride sufficient to increase the yield of methyldichlorosilane without substantially reducing the combined yield of dimethyldichlorosilane and methyldichlorosilane, producing more than 5 weight percent of methyltrichlorosilane or producing more than trace amounts of inorganic chlorosilanes selected from at least one of trichlorosilane and tetrachlorosilane.

4,966,987

FLUORO-CONTAINING 1-ARYLALKOXYTRIS(DIALKYLAMINO)PHOSPHONIUM SALT, A PROCESS FOR THEIR PREPARATION AND THEIR USE

Alfred Kruse, Kelkheim; Günter Siegemund, Hofheim am Taunus; Axel Schumann, Alfter, and Ingo W. Ruppert, deceased, late of Bonn, all of Fed. Rep. of Germany (by Carl H. Schroeder, legal representative), assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

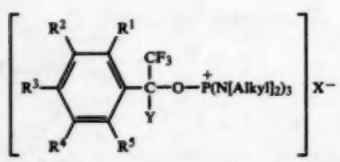
Filed Jan. 17, 1989, Ser. No. 297,424

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1988, 3801248

Int. Cl.[5] C07F 9/02

U.S. Cl. 558—115 **14 Claims**

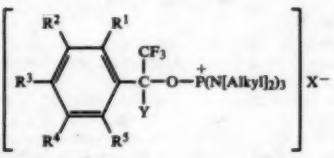
1. 1-Arylalkoxy-tris(dialkylamino)phosphonium salts of the formula I



(I)

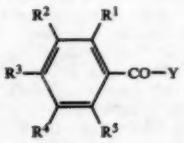
wherein the substituents R^1 to R^5 are equal or different and represent hydrogen, alkyl having from 1 to 6 carbon atoms which may be perfluorinated, halogen, alkoxy or alkylthio, each having from 1 to 6 carbon atoms, Y represents hydrogen or a perfluoroalkyl group C_nF_{2n+1} having from 1 to 6 carbon atoms, X represents bromine or iodine and "Alkyl" represents an alkyl group of 1 to 3 carbon atoms, at most 3 of the groups R^1 to R^5 having a meaning other than hydrogen.

7. A process for the preparation of 1-aryloxy-tris(dialkylamino)phosphonium salts of the formula I



(I)

wherein the substituents R^1 to R^5 are equal or different and represent hydrogen, alkyl having from 1 to 6 carbon atoms which may be perfluorinated, halogen, alkoxy or alkylthio each having from 1 to 6 carbon atoms, Y represents hydrogen or a perfluoroalkyl group C_nF_{2n+1} having from 1 to 6 carbon atoms, X represents bromine or iodine and "Alkyl" represents an alkyl group of 1 to 3 carbon atoms, at most 3 of the groups R^1 to R^5 having a meaning other than hydrogen, which comprises reacting an aromatic carbonyl compound of the formula II



(II)

with a trifluoromethyl halide of the formula CF_3X (III) and a trisdialkylamide of phosphorous acid of the formula $P(N(Alkyl|_2)_3$ (IV), in formulae II, III and IV R^1 to R^5, Y, X and Alkyl having the afore-mentioned meaning.

4,966,988

PROCESS FOR PREPARING ACETONITRILE 3-TRIFLUOROMETHYL BENZENE

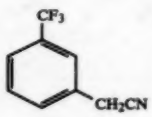
William L. Schinski, San Rafael, and Peter Denisevich, Jr., Fairfax, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Feb. 17, 1989, Ser. No. 312,140

Int. Cl.[5] C07C 253/14

U.S. Cl. 558—342 **20 Claims**

1. A process for preparing a compound of formula I:



I

comprising the steps of:

A. chlorinating m-xylene to form a chlorinated mixture comprising α,α,α'-trichloro-m-xylene;

B. treating said α,α,α'-trichloro-m-xylene with a chlorinating agent selected from the group consisting of carbon tetrachloride, hexachloroethane and a combination thereof, in the presence of an aqueous solution containing greater than about 50% by weight of a hydroxide base and a phase transfer catalyst at a temperature in the range of

about 40 to 120 degrees Centigrade at atmospheric pressure to form α,α,α,α′-tetrachloro-m-xylene;

C. treating said α,α,α,α′-tetrachloro-m-xylene with at least a stoichiometric amount of a fluorinating agent to form α,α,α-trifluoro-α′-chloro-m-xylene;

D. treating said α,α,α-trifluoro-α′-chloro-m-xylene with an alkali metal cyanide to form said compound of formula I.

4,966,989

PROCESS FOR THE PRODUCTION OF 4-CHLORO-3-ALKOXY-BUT-2E-ENOIC ACID ALKYL ESTERS

Laurent Duc, Sion, Switzerland, assignor to Lonza Ltd., Gampel, Switzerland

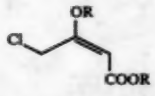
Filed Jun. 8, 1989, Ser. No. 362,965

Claims priority, application Switzerland, Jun. 14, 1988, 2288/88

Int. Cl.[5] C07C 69/73

U.S. Cl. 560—183 12 Claims

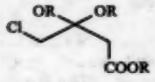
1. Process for the production of 4-chloro-3-alkoxy-but-2E-enoic acid alkyl esters of the formula:



wherein R is an alkyl with 1 to 4 C atoms, characterized in that 4-chloroacetoacetic acid chloride is reacted with a dialkyl sulfite of the formula:

$(RO)_2S{=}O$

wherein R is the same as defined above, and the corresponding alcohol ROH, wherein R is the same as defined above, to the ketal ester of the formula:



wherein R is the same as defined above, and said ketal ester is reacted without isolation by warming under reduced pressure in the presence of an acid to the end product.

4,966,990

PROCESS FOR PRODUCING METHACRYLIC ACID AND/OR METHACRYLIC ACID ESTER

Masayuki Otake, Yokohama; Takaski Ushekubo, Yokohama both of Japan, assignor to Mitsubishi Kasei Corporation, Tokyo, Japan

This application Feb. 24, 1989, Ser. No. 314,257

Claims priority, application Japan, Jul. 20, 1982, 57-126307

Int. Cl.[5] C07C 67/30

U.S. Cl. 560—214 2 Claims

1. A process for producing methacrylic acid and/or methacrylic acid ester by the oxidative dehydrogenation of isobutyric acid and/or isobutyric acid ester, comprising: reacting said isobutyric acid and/or isobutyric acid ester in the vapor phase in the presence of oxygen over a catalyst having the formula: $(MO)_{12}(V)_b(P)_c(Cu)_d(As)_e(X)_f(O)_g$ wherein X denotes at least one element selected from the group consisting of lithium, beryllium, magnesium, tungsten and tellurium; subscripts b, c, d, e, f and g each denoting the atomic ratio of the representative elements and having the values: $0.5 \leqq b \leqq 3$, $0.2 \leqq c \leqq 2$, $0.005 \leqq d \leqq 2$, $0.005 \leqq e \leqq 0.2$ and $0.06 \leqq f \leqq 2$; and the value of g is determined by the ratio and valences of the other elements in the catalyst, at least a part of the catalyst having the heteropoly acid structure.

4,966,991

PROCESS FOR THE PREPARATION OF ALKALI METAL PHOSPHONOFORMATES

Thomas Gerdau, Eppstein, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 21,998, Mar. 5, 1987, abandoned. This application Jul. 1, 1988, Ser. No. 214,867

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1986, 3607445

Int. Cl.[5] C07F 9/38

U.S. Cl. 562—24 14 Claims

1. A process for the production of alkali-phosphonoformates which comprises reacting in a first stage a trialkyl ester of phosphonoformic acid with an aqueous solution of an alkali hydroxide, the temperature being kept in the range of from the freezing point of water to 40° C., to effect partial saponification of the ester bonds, thus suppressing decarboxylation, then either keeping the resulting mixture in a second stage in the said temperature range for further progress of the reaction and then heating the reaction mixture in a third stage to a temperature above about 40° C. and up to 100° C. for completion of the saponification, or heating the reaction mixture in a second stage immediately for completion of the saponification to a temperature above 40° C. and up to 100° C.

4,966,992

PROCESS FOR PRODUCTION OF AROMATIC HYDROXYCARBOXYLIC ACID

Ryuzo Ueno, Nishinomiya; Yoshiyasu Masada, Hirakata; Yoshihiko Kuwae, and Keiji Kawata, both of Nishinomiya, all of Japan, assignors to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo, Osaka, Japan

Filed Jan. 18, 1989, Ser. No. 298,135

Claims priority, application Japan, Jan. 23, 1988, 63-13437

Int. Cl.[5] C07C 51/15

U.S. Cl. 562—424 8 Claims

1. In a process for production of an aromatic hydroxycarboxylic acid which comprises reacting alkaline metal salts of phenols or naphthols selected from the group consisting of sodium phenolates, potassium phenolates, sodium α-naphtholates, potassium α-naphtholates, and sodium β-naphtholates, with carbon dioxide under such a condition that said alkaline metal salts of phenols or naphthols are melted in the presence of a reaction medium, the improvement which comprises removing by-products such as phenols or naphthols by discharging, during the reaction, CO_2 gas which contains vapor of the by-products out of the reaction vessel.

4,966,993

PROCESS FOR PREPARATION OF 3-HYDROXY-3-METHYL-GLUTARIC ACID

Luigi Turbanti, Pisa, and Giorgio Garzelli, Leghorn, both of Italy, assignors to Laboratori Guidotti SpA, Pisa, Italy

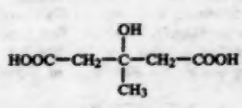
Continuation of Ser. No. 133,198, Dec. 15, 1987, abandoned, which is a continuation-in-part of Ser. No. 792,446, Oct. 29, 1985, abandoned. This application Apr. 12, 1989, Ser. No. 338,406

Claims priority, application Italy, Oct. 29, 1984, 23360 A/84

Int. Cl.[5] C07C 51/27

U.S. Cl. 562—540 4 Claims

1. A process for the preparation of 3-hydroxy-3-methyl-glutaric acid having the formula:



(I)

and which is devoid of inorganic substances, comprising, in combination:

slowly adding a small portion of 3-methyl-1,3,5-pentanetriol

to an excess of nitric acid having a density of between 1.20 and 1.50 at a temperature not lower than 25° C. to form a reaction solution;

awaiting development of nitrogen tetroxide and an increase in temperature to indicate that the reaction has started;

adding the remaining 3-methyl-1,3,5-pentanetriol to said solution over a period of about 2 hours and simultaneously cooling the reaction mixture to maintain the reaction mixture at a temperature of from 25° to 35° C.;

allowing the reaction to complete at about 25° to 35° C. for about two hours and at about 50° to 55° C. for about half an hour;

evaporating the resulting solution under vacuum at a temperature below 50° C. and dissolving the resulting oily residue in a solvent and distilling the resulting solution under vacuum and cooling the residue of said distilling to form the desired product.

4,966,994

METHOD FOR PURIFYING L-GLUTAMINE

Masashi Miyazawa; Toyokazu Kaneko; Tetsuya Kaneko, and Kenichi Yarita, all of Kawasaki, Japan, assignors to Ajinomoto Company, Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 378,042

Claims priority, application Japan, Jul. 11, 1988, 63-170962

Int. Cl.[5] C07C *227/00*

U.S. Cl. 562—554 **5 Claims**

1. A method for purifying L-glutamine which comprises:

(i) concentrating a fermentation liquor containing 40 g/l or more of L-glutamine or a solution obtained therefrom from which microbial cells have been removed, at a pH of 5.6±0.5, thereby giving a slurry of L-glutamine crystals of 70 g/l or higher concentration;

(ii) separating said crystals from the mother liquor and then dissolving the separated crystals in water; and

(iii) bringing the water solution of L-glutamine in contact with an OH-type anion-exchange resin, thereby removing any impurities in the water solution by adsorption.

4,966,995

PROCESS FOR THE PREPARATION OF CHLORIDES OF CARBOXYLIC ACIDS

Jeanaine Chodorge, Antony; Jean-Pierre Senet, Herbeauvilliers-Buthiers, and Gary Wooden, Meneecy, all of France, assignors to Societe Nationale Des Poudres et Explosifs, Paris, France

Filed Oct. 17, 1988, Ser. No. 258,634

Claims priority, application France, Nov. 5, 1987, 87 15344

Int. Cl.[5] C07C *51/58*

U.S. Cl. 562—861 **10 Claims**

1. Process for the preparation of chlorides of carboxylic acids, characterized in that tetrachloroethylene carbonate is reacted with a carboxylic acid at a temperature of between 80° C. and 160° C.

4,966,996

PROCESS FOR THE PREPARATION OF E-2-PROPYL-2-PENTENOIC ACID AND PHYSIOLOGICALLY COMPATIBLE SALTS THEREOF

Helmut Schäfer, Kayhude, Fed. Rep. of Germany, assignor to Desitin Arzneimittel GmbH, Hamburg, Fed. Rep. of Germany

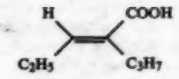
Filed Jun. 2, 1988, Ser. No. 203,293

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1987, 3718801

Int. Cl.[5] C07C *27/02, 51/41, 57/03*

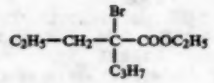
U.S. Cl. 562—898 **3 Claims**

1. Process for preparing E-2-propyl-2-pentenoic acid of the formula:



(I)

comprising reacting 2-bromo-2-propyl-pentanoic acid ethyl ester of the formula:



(II)

at elevated temperature with triethylene diamine in acetonitrile as the solvent to remove HBr from the acid ethyl ester and thereafter converting the ester by saponification to form E-2-propyl-2-pentenoic acid.

4,966,997

TRISHYDROXAMIC ACIDS

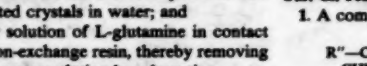
Abraham Shanzer, Rishon Le Zion; Jacqueline Libman, and Shneior Lifson, both of Rehovot, all of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed Oct. 11, 1988, Ser. No. 255,584

Int. Cl.[5] C07C *83/10*

U.S. Cl. 562—623 **11 Claims**

1. A compound of the general formula



where R, R', R" and R"' are independently selected from the group consisting of hydrogen, alkyl, aralkyl, aryl, alkyl —COOR, alkyl —CONHR and alkyl —$CONR_2$, and where n is 1 or 2, m is 0, 1, or 2, q is 0 or 1.

4,966,998

TRISUBSTITUTED BENZOIC ACID INTERMEDIATES

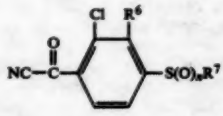
David L. Lee, Martinez, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 709,006, Mar. 7, 1985, Pat. No. 4,898,973. This application Dec. 7, 1989, Ser. No. 447,360

Int. Cl.[5] C07C *255/18*

U.S. Cl. 562—869 **1 Claim**

1. Compounds having the structural formula



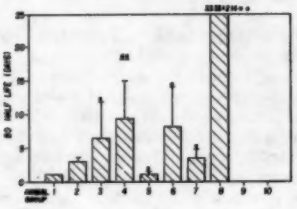
wherein R^6 is chlorine, C_1–C_4 alkoxy or C_1–C_4 alkylthio; n is the integer 0 or 2; and R^7 is C_1–C_4 alkyl.

4,966,999

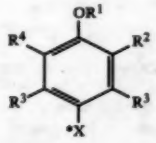
RADIOHALOGENATED COMPOUNDS FOR SITE SPECIFIC LABELING

Daniel J. Coughlin, Robbinsville; Benjamin A. Belinka, Kendal Park, both of N.J., and Vernon L. Alvarez, Morrisville, Pa., assignors to Cytogen Corporation, N.J.

Filed Jun. 7, 1988, Ser. No. 203,793
Int. Cl.[5] C07C *109/10*; A61K *49/02, 39/395*
U.S. Cl. 564—150 4 Claims



1. A compound of the formula:



in which

R^1=H, alkyl or hydroxyalkyl;

R^2=acid hydrazide, alkyl acid hydrazide, hydrazino, alkylhydrazine, alkylphenylhydrazine, alkylamine or alkoxyamine;

R^3=H, alkyl or R^2;

R^4=alkyl, hydroxyalkyl or R^2; and

*=X a radioactive isotope of iodine, bromine, fluorine or astatine.

4,967,000

SPHERICAL NITROGUANIDINE PROCESS

John A. Sanchez; Edward L. Roemer, and Lawrence A. Stretz, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Sep. 12, 1989, Ser. No. 406,010
Int. Cl.[5] C07C *277/08*
U.S. Cl. 564—242 9 Claims

1. A process for the preparation of spherical high bulk density nitroguanidine comprising:

a. dissolving low bulk density nitroguanidine in N-methyl pyrrolidone at temperature of from about 55°C. to about 120°C.;

b. cooling the solution of nitroguanidine in N-methyl pyrrolidone to temperatures from about 0° about 70° as a liquid characterized as a nonsolvent for nitroguanidine is added to the solution; and,

c. separating spherical high bulk density nitroguanidine from the solution.

4,967,001

ALKYLATION OF TOLUENEDIAMINE AND PARA-PHENYLENEDIAMINE WITH ISOBUTYLENE IN THE PRESENCE OF ACIDIC, CRYSTALLINE MOLECULAR SIEVES

Robert L. Fowlkes, Milton, Fla., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 30, 1988, Ser. No. 213,659
Int. Cl.[5] C07C *205/00, 207/00, 45/00*
U.S. Cl. 564—305 12 Claims

1. In a process for producing ring alkylated toluenediamine and para-phenylenediamine amines by the reaction of said amines with isobutylene in the presence of an acidic crystalline alumino-silicate catalyst, the improvement for retarding catalyst deactivation in the ring alkylation of said amines which comprises contacting the catalyst with water in an amount sufficient for retarding deactivation of the catalyst but insufficient for substantially retarding the reaction.

4,967,002

PROCESSES FOR SQUARAINE COMPOUNDS

Anthony J. Paine, Mississauga, Canada, assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 1, 1987, Ser. No. 68,500
Int. Cl.[5] C07C *85/00*
U.S. Cl. 564—307 27 Claims

1. A process for the preparation of squaraine compounds which comprises reacting an aromatic amine with squaric acid in the presence of an aliphatic alcohol and a trialkylorthoformate.

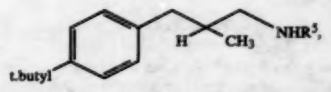
4,967,003

PROPYLAMINES, AND THEIR USE AS FUNGICIDES

Costin Rentzea, Heidelberg; Walter Himmele, Walldorf; Ernst Buschmann; Eberhard Ammermann, both of Ludwigshafen, and Ernst-Heinrich Pommer, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 7, 1986, Ser. No. 928,006
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541181
Int. Cl.[5] C07C *87/28*
U.S. Cl. 564—381 2 Claims

1. An N-arylpropyl-substituted secondary amine of the formula



I

where R^5 is alkyl of 1 to 10 carbon atoms, cycloalkyl of 3 to 12 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, cycloalkylalkyl of 4 to 13 carbon atoms, alkenyl of 3 to 6 carbon atoms or a phenyl or phenyl-C_1–C_6-alkyl radical which is unsubstituted or substituted by halogen, C_1–C_4-alkyl, halo-C_1–C_4-alkyl, C_1–C_4-alkoxy or cyano, or a salt thereof.

4,967,004

PROCESS FOR PRODUCING N,N-DIETHYLAMINOPHENOLS

Hiroshi Maki, and Shigeru Sasaki, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 8, 1988, Ser. No. 179,447
Claims priority, application Japan, Apr. 9, 1987, 62-88068; Apr. 21, 1987, 62-99047
Int. Cl.[5] C01C *209/00*
U.S. Cl. 564—397 4 Claims

1. A process for producing an N,N-diethylaminophenol comprising the steps of:

subjecting an aminophenol to reductive alkylation with acetaldehyde in the presence of a first solvent, a catalyst, and hydrogen to form a reductive alkylation reaction mixture;

removing said first catalyst from said reductive alkylation reaction mixture;

distilling the resulting reaction mixture in a distillation column while maintaining the bottom temperature of the distillation column at 160° C. or lower to substantially remove the unreacted acetaldehyde and said first solvent;

distilling the residue of said distilled reaction mixture while maintaining the bottom temperature of said distillation column at 200° C. or lower to recover crude N,N-diethylaminophenol as a distillate;

contacting said recovered crude N,N-diethylaminophenol distillate with a second solvent in an inert gas atmosphere composed of at least one gas selected from a group consisting of nitrogen, argon, and helium, to form a solution; said second solvent comprising

i) at least one component selected from a group consisting of water and aliphatic hydrocarbons, and

ii) at least one component selected from a group consisting of acid sulfites and dithionites;

cooling the solution containing said crude N,N-diethylaminophenol and said second solvent to precipitate substantially pure N,N-diethylaminophenol; and

recovering said N,N-diethylaminophenol.

4,967,005

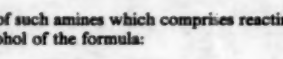
METHOD OF PREPARING ALKOXYLATED TERTIARY AMINES

Kim R. Smith, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

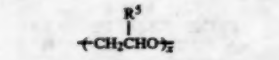
Filed Oct. 20, 1988, Ser. No. 260,511
Int. Cl.[5] C07C 93/04
U.S. Cl. 564—475 **9 Claims**

1. A method for preparing at ambient pressure an alkoxylated tertiary amine having the formula:

or a mixture of such amines which comprises reacting an oxyalkylated alcohol of the formula:



or a mixture of such alcohols, with a secondary amine of the formula HNR_3R_4 at elevated temperature in the presence of a catalytic quantity of an amination catalyst comprising metallic iridium in the presence of added hydrogen wherein R is a straight or branched chain alkyl group having from 1 to 20 carbon atoms, a cyclic alkyl group having from 5 to 10 carbon atoms, an aryl group having up to 12 carbon atoms, or an aralkyl or alkaryl group having up to 18 carbon atoms, R_1 is a single unit or a series of units of the formula:



wherein in each unit R_5 is independently selected from the group consisting of hydrogen and a straight or branched chain alkyl group having from 1 to 12 carbon atoms and x is an integer of from 0 to 40, R_2 is hydrogen or a straight or branched chain alkyl group having from 1 to 12 carbon atoms, R_3 and R_4 are each independently selected from the group consisting of straight and branched chain alkyl groups having from 1 to 12 carbon atoms, cyclic alkyl groups having from 5 to 10 carbon atoms, 1 to 4 carbon atom alkyl substituted or unsubstituted benzyl groups and allyl.

4,967,006

COPRODUCTION OF PROPANEDIAMINE AND ALKYLATED AMINOPROPYLAMINES

Richard V. C. Carr, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 7, 1989, Ser. No. 334,848
Int. Cl.[5] C07C 209/26, 209/48, 209/60
U.S. Cl. 564—490 **4 Claims**

1. In a process for producing propanediamine by the cyanoethylation of ammonia followed by the catalytic reduction of the nitrile group to the amine, the improvement for coproducing alkylated iminobispropylamine which comprises:

effecting cyanoethylation of ammonia by reaction of ammonia with acrylonitrile utilizing a mole ratio of ammonia to acrylanitrile from 5–15:1 under conditions for forming aminopropionitrile and iminobispropionirile;

separating aminopropionitrile from iminobispropionitrile generated in the cyanoethylation of ammonia;

contacting the iminobispropionitrile with a C_{1-6} alkylaldehyde in the presence of hydrogen under conditions for effecting reductive alkylation of the iminobispropionitrile and ineffective for effecting substantial hydrogenation of the nitrile group to form the corresponding iminobispropylamine;

contacting the alkylated iminobispropionitrile with hydrogen in the presence of a hydrogenation catalyst under conditions effective for reducing the nitrile groups to the amine forming alkylated iminobispropylamine; and

contacting the aminopropionitrile with hydrogen in the presence of a hydrogenation catalyst under conditions effective for reducing the nitrile group to the amine, and thereby forming propanediamine.

4,967,007

IMPROVED PROCESS FOR THE PREPARATION OF 1-SUBSTITUTED AMINO-1-SUBSTITUTED THIO-2-NITRO ALKENES

Abdul R. A. S. Deshmukh; Baburao M. Bhawal; Vasudeo P. Shiralkar, and Srinivasachari Rajappa, all of Maharashtra, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Filed May 16, 1989, Ser. No. 353,388
Int. Cl.[5] C07C 321/00, 323/00, 381/00
U.S. Cl. 564—501 **13 Claims**

1. An improved process for the preparation of 1-substituted amino-1-substituted thio-2-nitro alkenes of general formula (R_1NH) (R_2S) $C{=}CR_3$ (NO_2) wherein R_1, R_2, R_3, may be same or different and may consist of hydrogen, alkyl, aryl or arylalkyl groups or combinations thereof, which comprises reacting a primary amine with a compound of sulfur selected from the group consisting of carbon disulfide and dialkyltrithiocarbonate in the presence of a primary catalyst to obtain a carbonimidodithioic acid salt, converting the said salt to the corresponding carbonimidodithioic acid ester and reacting said ester with a nitro methane in the presence of a zeolite as a secondary catalyst to obtain the 1-substituted amino-1-substituted thio-2-nitro alkenes.

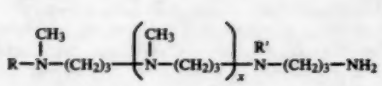
4,967,008

POLYAMINES AND THEIR PREPARATION

Floyd E. Friedli, Dublin, and Robert M. Gilbert, Columbus, both of Ohio, assignors to Sherex Chemical Company, Inc., Dublin, Ohio

Filed Jan. 12, 1990, Ser. No. 464,293
Int. Cl.[5] C07C 211/14
U.S. Cl. 564—512 **4 Claims**

1. A polyamine represented by:



where R is C_{8-22} alkyl
R' is H or CH_3, and
x is 0–3.

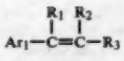
4,967,009

METHOD FOR OXIDIZING UNSATURATED AROMATIC COMPOUNDS

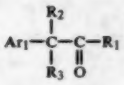
Isoo Shimizu; Yasuo Matsumura, both of Yokohama, and Kouichi Iwamoto, Kawasaki, all of Japan, assignors to Nippon Petrochemicals Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 377,183
Claims priority, application Japan, Jul. 8, 1988, 63-170577; Jul. 8, 1988, 63-170578; Jul. 8, 1988, 63-170579
Int. Cl.[5] C07C 00/00
U.S. Cl. 568—309 8 Claims

1. A method for manufacturing aromatic compounds having the following formula (II) comprising the step of reacting an unsaturated aromatic compound having the following formula (I) with an aryl compound having at least one iodosyl group or a salt thereof within a range of a reaction temperature of from −50° to 200° C.:



(I)



(II)

wherein Ar_1 is an aryl or substituted aryl group, each of R_1, R_2 and R_3 is hydrogen atom, a lower alkyl group having 1–4 carbon atoms or an aryl or substituted aryl group, and R_1, R_2 and R_3 may be the same or different groups, respectively.

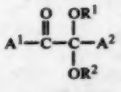
4,967,010

PREPARATION OF SYMMETRIC AND ASYMMETRIC MONOACETALS OF AROMATIC 1,2-DIKETONES

Andreas Boettcher, Nussloch, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

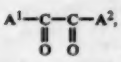
Filed Sep. 19, 1989, Ser. No. 410,042
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 3834029
Int. Cl.[5] C07C 45/64
U.S. Cl. 568—315 7 Claims

1. A process for the preparation of a symmetric or an asymmetric 1,1-acetal of an aromatic 1,2-diketone of the general formula I



I

where A^1 and A^2 are aromatic radicals and R^1 and R^2 are identical or different, unsubstituted or substituted, straight-chain or branched alkyl radicals of 1 to 10 carbon atoms, from the corresponding aromatic 1,2-diketone of the general formula II



II

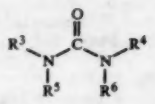
wherein the 1,2-diketone, in a nonpolar aprotic solvent, is reacted with an alkylating agent

$(R^1)_nX$,

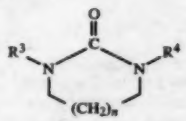
an alcoholate

$(R^2O)_mM$,

where n and m are integers of from 1 to 3, X is a radical of a monobasic to tribasic acid containing a sulfur, a phosphorous or a halogen atom, and M is a metal of main groups 1 to 3 of the periodic table of the elements, in the presence of a urea derivative of the formula III or IV



III



IV

or of a mixture of III or IV, where n is from 0 to 3 and R^3, R^4, R^5 and R^6 are identical or different, straight-chain or branched alkyl radicals of 1 to 6 carbon atoms or hydrogen, as a catalyst at from −20 to + 100° C.

4,967,011

PROCESS FOR DECOMPOSING AROMATIC ACYLATED COMPOUND.HF-BF_3 COMPLEX

Nobuyuki Tokura; Tadayoshi Takefumi; Shunichi Matsumoto; Tatsuhiko Yanagawa; Yoshihiro Shiokawa, and Ichiyo Ohtsuka, all of Kurashiki, Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Filed Aug. 11, 1989, Ser. No. 392,514
Claims priority, application Japan, Sep. 30, 1988, 63-243919
Int. Cl.[5] C07C 45/82
U.S. Cl. 568—325 5 Claims

1. A process for decomposing an aromatic acylated compound·HF-BF_3 complex obtained by reacting an aromatic compound selected from the group consisting of alkylbenzene, naphthalene, alkylnaphthalene, phenol and aromatic ethers, with an acylating agent in the presence of HF-BF_3 as a catalyst, comprising subjecting the aromatic acylated compound·HF-BF_3 complex to thermal decomposition in a distillation column heated to 100°–180° C. at the column bottom in the presence of, as a decomposing agent, at least one aromatic hydrocarbon selected from benzene, toluene and chlorobenzene and at least one saturated aliphatic hydrocarbon selected from pentane, hexane and cyclohexane.

4,967,012

ACETALS, AND A PROCESS FOR THE PREPARATION THEREOF

Klaus Günther, Eppstein/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 357,043

Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818244

Int. Cl.[5] C07C *49/255*

U.S. Cl. 568—415 3 Claims

1. An acetal of the formula (I)

$$CH_3—CO—CH=C(OR)_2 \quad (I)$$

where R is $—(CH_2)_n—OR'$ where n is 2 and R' is C_1–C_5—alkyl.

4,967,013

PREPARATION OF HYDROXYBENZALDEHYDES

Werner Steck, Ludwigshafen; Helmut Lermer, Mannheim; Harald Rust, Neustadt; Gerhard Fritz, Dannstadt-Schauernheim, and Hardo Siegel, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshaften, Fed. Rep. of Germany

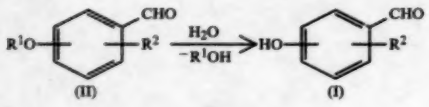
Filed May 3, 1989, Ser. No. 346,714

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815292

Int. Cl.[5] C07C *45/00*

U.S. Cl. 568—433 12 Claims

1. A process for the preparation of a hydroxybenzaldehyde of the formula (I) from a benzaldehyde of the formula (II) or its acetal, in which R^1 in the R^1O-phenyl ether group is an alkyl, cycloalkyl, alkylcycloalkyl or alkylaryl radical, R^2 is H or OH or is identical to R^1 and one or more R^1O-phenyl ether groups are ortho, meta or para to the aldehyde function, wherein a benzaldehyde of the formula (II) or its acetal, in which R^1 and R^2 have the abovementioned meanings and one or more R^1O-phenyl ether groups occupy the abovementioned position with respect to the aldehyde function, is converted into a hydroxybenzaldehyde of the formula (I) in the presence of water over a zeolite as a heterogeneous catalyst.



(II) (I)

4,967,014

PROCESS FOR PRODUCING FORMALDEHYDE AND DERIVATIVES THEREOF

Junzo Masamoto; Junzo Ohtake, both of Okayama, and Mamoru Kawamura, Saitama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 3, 1989, Ser. No. 305,596

Claims priority, application Japan, Feb. 3, 1988, 63-21872

Int. Cl.[5] C07C *45/32, 45/37*

U.S. Cl. 568—458 17 Claims

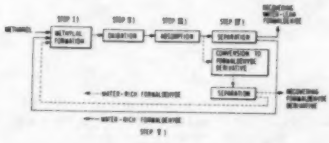
1. A process for producing formaldehyde or a derivative thereof from methanol, comprising the steps of:

(i) heating methanol and formaldehyde in aqueous solution in the presence of an acidic catalyst to obtain methylal;

(ii) oxidizing the resulting methylal using oxygen as an oxidizing agent in the presence of an oxide containing as effective components iron and molybdenum, or an oxide containing as effective components iron, molybdenum and at least one metal element selected from the group consisting of alkali metals, bismuth, chromium, tungsten, cobalt and nickel to obtain a formaldehyde gas;

(iii) absorbing the formaldehyde gas resulting from the oxidation reaction into water or into an aqueous formaldehyde solution to obtain an aqueous formaldehyde solution;

(iv) separating the aqueous formaldehyde solution obtained in step (iii) into formaldehyde of a lower water content and formaldehyde of a higher water content; and



(v) returning the water-rich formaldehyde separated in step (iv) to step (i) for further use as the formaldehyde component, wherein said derivative of formaldehyde is selected from trioxane, paraformaldehyde, the condensation product of urea and formaldehyde and the condensation product of phenol and formaldehyde.

4,967,015

POLYTETRAHYDROFURAN VINYL ETHERS

Michael Karcher, Dossenheim; Heinz Eckhardt, Ludwigshafen, and Jochem Henkelmann, Bensheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 16, 1989, Ser. No. 422,134

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837469

Int. Cl.[5] C07C *43/16*

U.S. Cl. 568—616 4 Claims

1. A polytetrahydrofuran vinyl ether of the formula

$$H_2C=HC—[O—CH_2—CH_2—CH_2—CH_2—]_nO—R \quad I$$

where R is hydrogen or the $CH_2=CH$ radical and n is from 2 to 150.

4,967,016

ALKOXYLATION PROCESS CATALYZED BY BARIUM PHOSPHATE

Richard A. Kemp, Stafford, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 354,050, May 19, 1989, abandoned. This application Jan. 29, 1990, Ser. No. 471,690

Int. Cl.[5] C07L *41/03*

U.S. Cl. 568—618 66 Claims

1. A process for the preparation of alkylene oxide adducts of active hydrogen containing organic compounds, which comprises contacting and reacting an alkylene oxide reactant comprising one or more vicinal alkylene oxides with an active hydrogen containing reactant comprising one or more active hydrogen containing organic compounds, in the presence of a catalyst comprising a catalytically effective amount of barium phosphate.

4,967,017

ALCOHOL ETHOXYLATES OF REDUCED EO CONTENT OR RESIDUAL PO CONTENT

Karl Schmid, Mettmann; Alfred Meffert, Monheim; Klaus Friedrich, Duesseldorf; Michael Langen, Hilden, and Klaus Herrmann, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Mar. 31, 1989, Ser. No. 332,673

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811319

Int. Cl.[5] C07C *41/03, 37/68*

U.S. Cl. 568—621 15 Claims

1. A process for the preparation of alcohol polyglycol ethers consisting of the steps of

A. reacting an alcohol having at least 6 carbon atoms with either ethylene oxide, propylene oxide, or a mixture thereof in the presence of from about 0.5% to about 1.8% by weight, expressed as sodium methylate, and based on the total weight of alcohol, ethylene oxide and propylene oxide employed in the reaction, of at least one basic alkali metal compound catalyst to produce a reaction mixture containing an alcohol polyglycol ether;

B. adding to the reaction mixture from about 0.3 to about 2% by weight, based on the weight of alcohol polyglcol ether, of at least one filter aid;

C. neutralizing the catalyst in the reaction mixture by the addition of an organic or inorganic acid thereto; and

D. filtering the reaction mixture to remove therefrom the filter aid and any precipitated salts that result from step C.

4,967,018

MONOALKYLENE GLYCOL PRODUCTION USING MIXED METAL FRAMEWORK COMPOSITIONS

Hwaili Soo; Bernard C. Ream, and John H. Robson, all of Charleston, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 125,134, Nov. 25, 1987, abandoned. This application Oct. 18, 1989, Ser. No. 423,703

Int. Cl.[5] C07C *29/00, 31.20, 33/26, 35/11*

U.S. Cl. 568—867 16 Claims

1. A process for producing monoalkylene glycol which comprises reacting a vicinal alkylene oxide with water as either a liquid or vapor in the presence of a hydrothermally stable mixed metal framework catalyst composition selected from at least one of

(a) a material having the stoichiometric formula:

$$M_x^{2+}Q_y^{3+}(OH)_{2x+3y-nz}A_z^{n-}\cdot a\ H_2O \quad (I)$$

wherein M is at least one divalent metal cation; Q is at least one trivalent metal cation; and A is at least one anion providing a valence (n−), wherein n is 1 to 4 and wherein a is a positive number, M, Q, and A are provided in a proportion such that x/y is a number equal to or greater than 1, z has a value greater than zero and 2x+3y−nz is a positive number, and M, Q and A are selected to provide a layered structure, and

(b) a material prepared by calcining the material of stoichiometric formula (I) having the formula

$$M_x^{2+}Q_y^{3+}(O)_{(2x+3y-nz)/2}D_z^{n-} \quad (II)$$

wherein M, Q, x, y, z and n have the same meanings defined above in connection with formula (I), and D is at least one nonvolatile anion.

4,967,019

METHOD OF MANUFACTURING 2-PROPYN-1-OL

Helmut Westernacher, Halternı; Karl Aertken, Duelmen, and Thomas Stieren, Haltern, all of Fed. Rep. of Germany, assignors to Gaf-Huels Chemie GMBH, Marl, Fed. Rep. of Germany

Continuation of Ser. No. 166,475, Mar. 10, 1988, Pat. No. 4,855,516. This application May 22, 1989, Ser. No. 354,877

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717471; May 23, 1987, 3717470; May 23, 1987, 3717468

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[5] C07C *27/00, 29/00, 33/042, 45/51*

U.S. Cl. 568—873 3 Claims

1. A method of manufacturing 2-propyn-1-ol, comprising the steps of:

decomposing 2-butyn-1,4-diol at elevated temperature in the presence of a copper acetylide catalyst, to form a reaction mixture comprising 2-propyn-1-ol and formaldehyde, and

removing said 2-propyn-1-ol from said reaction mixture,

wherein said 2-butyn-1,4-diol is decomposed at elevated temperature and pressure above 1 bar, in a low-boiling organic solvent in the presence of a copper acetylide catalyst in the presence of acetylene, to form a reaction mixture comprising 2-propyn-1-ol and formaldehyde, and said 2-propyn-1-ol is removed by distillation.

4,967,020

PROCESS FOR THE HYDRATION OLEFINS

David O. Marler, Deptford, N.J.; Charles M. Sorensen, Wilmington, Del., and Philip Varghese, Singapore, Singapore, assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 139,565, Dec. 30, 1987, abandoned. This application Aug. 3, 1989, Ser. No. 389,198

Int. Cl.[5] C07C *29/04, 31/10*

U.S. Cl. 568—896 15 Claims

1. A process for converting propylene to isopropyl alcohol which comprises contacting water with a feed comprising propylene at water:propylene mole ratio of at least about 0.5:1 under propylene hydration conditions in the presence of a hydration catalyst comprising an acidic zeolite having pore openings defined by: (1) a ratio of sorption of n-hexane to o-xylene, on a volume percent basis, of greater than about 3, which sorption is determined at a P/P_o of 0.1 and at a temperature of 50° C. for n-hexane and 80° C. for o-xylene and (2) by the ability of selectively cracking 3-methylpentane (3MP) in preference to the doubly branched 2,3-dimethylbutane (DMB) at 1000° F. and 1 atmosphere pressure from a 1/1/1 weight ratio mixture of n-hexane/3-methyl-pentane/2,3-dimethylbutane, with the ratio of rate constants k_{3MP}/k_{DMB} determined at a temperature of 1000° F. being in excess of about 2, the zeolite having a crystal size of not more than 0.2 micron, to produce isopropyl alcohol.

4,967,021

PROCESS FOR PREPARATION OF DEUTERATED METHYLENE CHLORIDE

Cal Y. Meyers, and Roch Chan-Yu-King, both of Carbondale, Ill., assignors to Southern Illinois University Foundation, Carbondale, Ill.

Continuation of Ser. No. 864,089, May 16, 1986, abandoned. This application Sep. 9, 1988, Ser. No. 242,354

Int. Cl.[5] C07C *17/24, 19/00, 19/02*

U.S. Cl. 570—101 37 Claims

1. A process for the preparation of deuterated methylene chloride comprising contacting methylene chloride with an aqueous phase containing deuterium oxide and a base in the presence of a phase-transfer catalyst.

4,967,022

PROCESS FOR FLUORINATED ALLENES

Ming-Hong Hung, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 29, 1989, Ser. No. 442,676
Int. Cl.[5] C07C 17/26, 17/30, 21/18
U.S. Cl. 570—136 4 Claims

1. A compound comprising formula (II):

$$H_2C{=}C{=}CH{-}R_f{-}CH{=}C{=}CH_2,$$

wherein

R_f is a diprimary disubstituted perfluorocarbyl radical up to about 20 carbon atoms which can contain one or more ether oxygen linkages.

4,967,023

PROCESS FOR PREPARING 1,1,1-TRIFLUORO-2,2-DICHLOROETHANE BY HYDROFLUORINATION IN THE PRESENCE OF CATALYSTS

Diego Carmello, Mestre, and Giorgio Guglielmo, Mirano, both of Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 163,659, Mar. 3, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,070
Claims priority, application Italy, Mar. 9, 1987, 19622 A/87
Int. Cl.[5] C07C 17/20, 19/02
U.S. Cl. 570—166 11 Claims

1. A continuous process for preparing 1,1,1-trifluoro-2,2-dichloroethane which comprises reacting perchloroethylene with HF in a gas phase in the presence of catalysts comprising Cr_2O_3 carried on AlF_3, without Al_2O_3, in the gamma and/or beta form.

4,967,024

CATALYZED HYDROFLUORINATION PROCESS

William H. Gumprecht, Wilmington, Del.; Wesley G. Schindel, Swedesboro, N.J., and Vinci M. Felix, Kennett Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 324,718, Mar. 17, 1989, abandoned, which is a continuation-in-part of Ser. No. 210,555, Jun. 23, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 365,165
Int. Cl.[5] C07C 17/08
U.S. Cl. 570—168 25 Claims

1. A liquid-phase process for the preparation of fluorinated alkanes of the formula

$$R^1R^2R^3C{-}CR^4R^5R^6$$

wherein R^1, R^2, R^3, R^4, R^5 and R^6 are individually selected from H, F and Cl, wherein at least one of R^1, R^2 and R^3 is H, and at least one of R^4, R^5 and R^6 is F which comprises contacting, at a temperature from 0° C. to 175° C. under substantially anhydrous conditions, one molar equivalent of a starting material selected from the group consisting of: (1) at least one halogenated alkene of the formula

$$R^1R^2C{=}CR^3R^4$$

wherein R^1, R^2, R^3 and R^4 are individually selected from H, F, and Cl; or (2) at least one chlorinated alkane of the formula

$$HR^1R^2C{-}CR^3R^4Cl$$

wherein R^1 and R^2 are individually selected from H and Cl, and wherein R^3 and R^3 are individually selected from H, Cl and F; with at least the stoichiometric molar equivalent of HF in the presence of at least 0.25 molar equivalent of at least one catalyst selected from tantalum pentafluoride (TaF_5) and niobium pentafluoride (NbF_5), with the proviso that the number of moles, "x", of catalyst plus the number of moles, "y", of HF, relative to the number of moles "z", of the halogenated starting material, are such that the total fluorine-to-starting material ratio, $(5x+y)/z$, equals at least (6-w) where "w" is the number of fluorine atoms in one mole of starting material so produce reaction products; removing said reaction products from contact with said catalyst and isolating a substantial yield of at least one fluorinated alkane having a substantially greater fluorine content than the starting material.

4,967,025

PURIFICATION METHOD OF CARBON FLUORIDES

Tadayuki Maeda, Ibaraki; Satoshi Koyama, Osaka, and Kazuo Okamura, Itami, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Jul. 11, 1989, Ser. No. 377,977
Claims priority, application Japan, Jul. 11, 1988, 63-172389
Int. Cl.[5] C07C 17/38
U.S. Cl. 570—177 4 Claims

1. A method for removing non-bonding fluorine from carbon fluorides by subjecting the carbon fluorides to contact treatment with gaseous materials which is a gas selected from the group consisting of hydrochloride gas, sulfur dioxide gas, nitrogen dioxide gas, hydrogen gas, steam and a mixed gas thereof.

4,967,026

PROCESS FOR THE PRODUCTION OF CHLOROMETHYL PHENETHYL BROMIDE

Stephen Daren, Ness Ziona, Israel, assignor to Bromine Compounds Ltd., Beer-Sheva, Israel

Filed May 11, 1989, Ser. No. 350,399
Claims priority, application Israel, May 12, 1988, 86366
Int. Cl.[5] C07C 17/32, 25/28
U.S. Cl. 570—194 16 Claims

1. A process for the production of chloromethyl phenethyl bromide, comprising reacting phenethyl bromide with HCl and formaldehyde in the presence of zinc chloride as catalyst and a chlorinated hydrocarbon as solvent.

4,967,027

METHOD OF INHIBITING POLYMERIZATION OF STYRENES

Hideyuki Takahashi, Ibaraki; Shohei Suzuki, Mie; Tomohiko Takahama, Mie; Tadamichi Aoki, Mie; Yoshikazu Higaki, Mie, all of Japan, and Karl Trukenbrod, Marl, Fed. Rep. of Germany, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan and Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jun. 20, 1989, Ser. No. 368,811
Int. Cl.[5] C07C 7/20
U.S. Cl. 585—5 7 Claims

1. A method of inhibiting polymerization of styrenes comprising the process of jointly using nitrosophenols and p-tertiarybutyl catechol for composing the polymerization inhibiting agent usable during the distillation process of styrenes.

4,967,028

ELECTRICAL INSULATING OIL COMPOSITION AND ELECTRICAL APPLIANCES IMPREGNATED THEREWITH

Atsushi Sato, Tokyo; Shigenobu Kawakami, Ichikawa; Keiji Endo, Yokosuka, and Hideyuki Dohi, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Filed May 6, 1988, Ser. No. 191,054
Int. Cl.[5] H01G 4/22; H01B 3/22
U.S. Cl. 585—6.3 17 Claims

1. An electrical insulating oil composition produced by bringing a by-product oil fraction comprising components with boiling points in the range of 260° to 330° C., atmospheric pressure, into liquid-liquid contact with an organic polar solvent by means of liquid-liquid extraction or extractive distilla-

tion and recovering the electrical insulating oil composition from the extract of liquid-liquid extraction or from the distillate of extractive distillation; said by-product oil fraction being formed by first preparing an alkylated product composed of unreacted benzene or unreacted toluene, ethylbenzene or ethyltoluene, polyalkylbenzenes and heavy components by alkylating benzene or toluene with ethylene in the presence of an alkylation catalyst, and then distilling said alkylated product to obtain said by-product oil fraction; said liquid-liquid extraction or said extractive distillation being conducted under conditions effective to produce said electrical insulating oil composition wherein the ratio of the integrated intensity as chemical shift at 120 to 155 ppm of the spectrum measured by ^{13}C NMR method to the total integrated intensity at 0 to 155 ppm of said spectrum is 70% or higher.

4,967,029

LIQUID LUBRICANTS FROM ALPHA-OLEFIN AND STYRENE COPOLYMERS

Margaret M. Wu, Belle Mead, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Sep. 7, 1989, Ser. No. 403,971
Int. Cl.[5] C10M *107/12*
U.S. Cl. 585—12 **18 Claims**

1. A process for the production of liquid hydrocarbon lubricant having enhanced thermal stability from C_{6-C20} alpha-olefins and vinyl aromatic compounds, comprising;

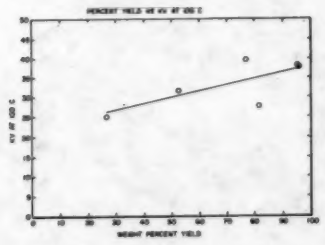
copolymerizing said alpha-olefins and vinyl aromatic compounds with chromium catalyst on a porous support, which catalyst has been treated by oxidation at a temperature of 200° C. to 900° C. in the presence of an oxidizing gas and then by treatment with a reducing agent at a temperature and for a time sufficient to reduce said catalyst to a lower valence state.

4,967,030

HYDROCRACKING HIGH VISCOSITY SYNTHETIC LUBRICANT

Michael E. Landis, Woodbury; Bruce P. Pelrine, Trenton, both of N.J., and Tsoung Y. Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 19, 1989, Ser. No. 367,995
Int. Cl.[5] C07C *1/00, 4/02*
U.S. Cl. 585—241 **22 Claims**



1. A process for the production of high viscosity index, low viscosity hydrocarbon lubricant from higher viscosity liquid hydrocarbon lubricant feedstock, comprising:

contacting said feedstock with hydrocracking catalyst and hydrogen under hydrocracking conditions in a hydrocracking zone, said feedstock having a viscosity index greater than 130, branch ratio below 0.19 and comprising the product of the oligomerization of C_6 to C_{20} alpha-olefin feedstock, or mixtures thereof, under oligomerization conditions in contact with a reduced valence state Group VIB metal catalyst on porous support; and

separating reduced viscosity, high VI liquid lubricant homologues of said lubricant feedstock in high yield.

4,967,031

HYDROGENATION USING HYDRIDES AND ACID

R. Morris Bullock, Wadiag River, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 13, 1989, Ser. No. 449,181
Int. Cl.[5] C07C *5/00*
U.S. Cl. 585—250 **19 Claims**

1. A process for the non-catalytic hydrogenation of an organic compound which contains at least one reducible functional group selected from the group consisting of C=C, C—OH, C—O—C, and a strained cyclic structure, the process comprising reacting the organic compound, a hydride complex and a strong acid in a liquid phase.

4,967,032

PROCESS FOR IMPROVING THERMAL STABILITY OF SYNTHETIC LUBES

Suzzy C. Ho, Plainsboro, and Margaret M. Wu, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Sep. 5, 1989, Ser. No. 402,373
Int. Cl.[5] C07C *5/22*
U.S. Cl. 585—255 **22 Claims**

1. A process for the production of hydrocarbon lubricant basestock having improved thermal stability, comprising;

contacting said lubricant basestock with acidic catalyst in an isomerization zone under isomerization conditions for a time sufficient to isomerize said basestock, said basestock comprising the saturated oligomerization product of C_2–C_{20} alpha-olefins in contact with reduced Group VIB metal oxide catalyst on porous solid support under oligomerization conditions; and

separating and recovering isomerized basestock having improved thermal stability.

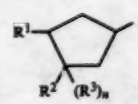
4,967,033

PROCESS FOR THE PREPARATION OF POLYUNSATURATED CYCLIC COMPOUNDS

Cyril Mahaim, Echichens, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

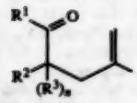
Filed Jan. 31, 1990, Ser. No. 472,921
Claims priority, application Switzerland, Feb. 9, 1989, 442/89-1
Int. Cl.[5] C07C *1/32, 2/76*
U.S. Cl. 585—358 **5 Claims**

1. A process for the preparation of a polyunsaturated cyclic compound of formula



(I)

having two conjugated double bonds in the endo- and exo-positions of the pentagonal cycle indicated by the dotted lines, and wherein symbols R^1 and R^2, when taken separately, represent respectively a. a linear or branched C_1 to C_4 alkyl radical and b. an hydrogen atom or a methyl radical, or, when taken together with the carbon atoms to which they are bonded form a polymethylenic cycle such as indicated by the dotted line, containing from 5 to 12 carbon atoms, and symbol R^3 stands for an hydrogen atom or a methyl radical said process comprising a vapor phase cyclization of an enone of formula



(II)

wherein the dotted line and the symbols n, R^1, R^2 and R^3 are defined as above, effected by means of a thermal treatment of said enone in the presence of a cyclization catalyst consisting of an aluminum, silicium, titanium or zirconium oxide.

4,967,034

PROCESS FOR THE ALKYLATION OF ALKANES OR AROMATIC HYDROCARBONS

Jorge P. Miller, and Miguel F. Kling, both of Bogota, Colombia, assignors to Energia Andina Ltd., New York, N.Y.

Filed Aug. 16, 1989, Ser. No. 403,742

Int. Cl.[5] C07C *2/64, 2/66, 2/58*

U.S. Cl. 585—446 9 Claims

1. A process for the alkylation of alkanes or aromatic hydrocarbons comprising:

(a) absorbing an alkene on a dry cation exchange resin, said resin being in the hydrogen form

(b) reacting said absorbed alkene with at least one alkane or at least one aromatic hydrocarbon, and

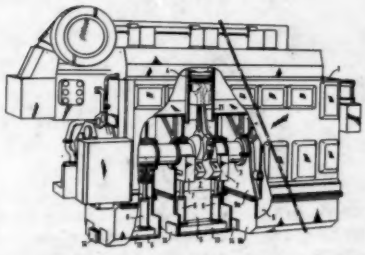
(c) maintaining said alkane or aromatic hydrocarbon, and conducting said reacting step, entirely in the vapor phase.

4,967,035

METHOD FOR TESTING DIFFERENT SUBSTANCES AND A COMBUSTION ENGINE FOR APPLYING THE METHOD

Gösta Liljenfeldt, Solf; Carl-Erik Rösgren, Vikby; Harry Sjöberg, and Rolf Vestergren, both of Vaasa, Finland, assignors to Oy Wärtsilä Ab, Helsinki, Finland

Filed Oct. 17, 1988, Ser. No. 258,783
Claims priority, application Finland, Oct. 23, 1987, 874689
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—116 27 Claims



1. A method for testing fluids in a diesel engine that comprises at least first and second cylinders, a fluid supply system for supplying a fluid to all cylinders of the engine, a crankshaft having length segments associated with the cylinders respectively, and a common crankcase through which the crankshaft extends, said method comprising the following steps:

(I) isolating parts of the fluid supply system for supplying fluid to the first cylinder from parts of the fluid supply system for supplying fluid to the second cylinder,

(b) supplying a first fluid to said first cylinder by way of the parts of the fluid supply system for said first cylinder, and

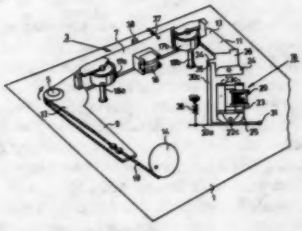
(c) simultaneously supplying a second fluid, different from the first fluid, to said second cylinder by way of the parts of the fluid supply system for said second cylinder.

4,967,036

ARRANGEMENT FOR CONTROLLING THE POSITION OF THE HEAD MOUNTING PLATE IN A MAGNETIC TAPE APPARATUS

Karl Klöe-Hein, Wismar, and Horst H. Rumpf, Herborn-Schönbach, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 2, 1988, Ser. No. 189,096
Claims priority, application Fed. Rep. of Germany, May 2, 1987, 3714702
Int. Cl.[5] G11B *21/12, 5/54*; F16H *25/08, 25/16*
U.S. Cl. 74—54 Claims



1. An electrical apparatus comprising a functional element mounted for movement between a rest position and first and second operating positions, said first operating position being spaced further from said rest position than said second operating position, means for moving said functional element from said rest position to said first operating position, biasing means for returning said functional element from said first and second operating positions to said rest position, and first electromagnetic holding means for electromagnetically holding said functional element in said first operating position, the improvement comprising:

a first armature plate mounted on said functional element for extension in the direction of said first electromagnetic holding means between first and second armature positions on said functional element, said second armature position being closer to said first electromagnetic holding means than said first armature position;

said positions being selected such that, with said first armature plate held by said first electromagnetic holding means, said functional element is in the first operating position when said first armature plate is in said first armature position and said functional element is in the second operating position when said first armature plate is in said second armature position;

biasing means for setting said first armature plate to said first armature position when said functional element is released from said first operating position and returned to said rest position, and

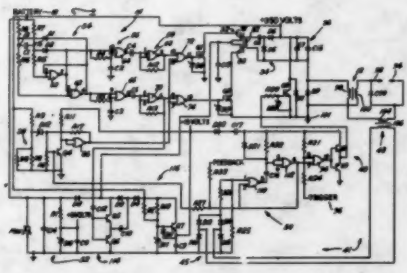
extension means for extending said first armature plate to said second armature position for setting the functional element to said second operating position.

4,967,037

DRIVING CIRCUIT FOR A CAPACITOR DISCHARGE IGNITION SYSTEM

William J. Roberts, Toledo, Ohio, assignor to Prestolite Electric Incorporated, Toledo, Ohio

Filed Jul. 14, 1989, Ser. No. 380,138
Int. Cl.[5] F02P *3/06*
U.S. Cl. 123—598 20 Claims



1. In an ignition system having load capacitance means for charging and discharging to drive an ignition coil, an ignition coil drive system operable with low peak input currents comprising:

means for supplying power;

an oscillator coupled to said power supply means for generating first and second complimentary pulse train drive signals, the frequency of said drive signals varying directly with the magnitude of said supplied power;

a step-up transformer having a primary winding coupled to said oscillator and having a secondary winding providing a transformer output signal, said primary winding of said step-up transformer including a center tap coupled to said power supply means and connected between a first primary winding and a second primary winding;

means coupled between the secondary winding of said transformer and said load capacitance means for increasing by a factor the magnitude of said transformer output signal

applied to said load capacitance means for charging said load capacitance means;

first means for switching between an open position and a closed position in response to said first pulse train; and second means for switching between an open position and a closed position in response to said second pulse train, said first primary winding of said transformer conducting current in a first direction when said first switch means is closed and said second primary winding conducting current in a second direction opposite said first direction when said second switch means is closed to induce current flowing in opposite directions in said secondary winding to charge said load capacitance means; and

means for delaying the rising edge of each pulse of said pulse trains so that said pulse trains are substantially complimentary.

4,967,038

DRY ELECTRODE BRAIN WAVE RECORDING SYSTEM

Alan S. Gevins, San Francisco; Donald Durousseau, Oakland, and Joel Libove, Fremont, all of Calif., assignors to Sam Techology Inc.

Continuation-in-part of Ser. No. 287,138, Dec. 21, 1988, abandoned, which is a continuation-in-part of Ser. No. 177,681, Apr. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 942,204, Dec. 16, 1986, Pat. No. 4,736,751. This application Aug. 25, 1989, Ser. No. 398,758

Int. Cl.[5] A61B 5/04

U.S. Cl. 128—644 20 Claims

1. An electrode hat to detect brain waves from the scalp of a patient in an electroencephalogram EEG system, the hat comprising:

a hat adapted to fit on the head of the patient;

a circuit board means within and conforming to the hat;

a plurality of electrodes mounted on the hat, each electrode comprisin a plurality of non-conductive elastic flexible fingers each having a free end portion, a conductive tip means at the end of each finger free end portion to make electrical contact with the scalp of the patient without abrading or hurting the scalp, said tip means including minimally a conductive tip to contact the scalp having a diameter of greater than 0.1-inch at its contact with the scalp, a surface which is smooth, non-pointed and non-abrasive to the scalp, and conductive means to conduct brain wave signals from the tip to said circuit board means;

and amplifier means mounted on said circuit board means to amplify the brain wave signals.

4,967,039

INSULATING LIQUIDS AND ELECTRIC CABLES

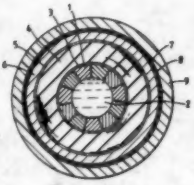
Navaratnam C. Mohan, New Malden, and Michael J. Poole, London, both of England, assignors to BICC Public Limited Company, London, England

Continuation of Ser. No. 197,316, May 23, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 434,479

Claims priority, application United Kingdom, Jun. 18, 1987, 8714291

Int. Cl.[5] H01B 3/22, 7/02

U.S. Cl. 174—25 C 8 Claims



1. A flame-retardant gas-absorbing insulating oil with a flashpoint above 150° C. consisting essentially of a silicone base oil and 2–8% of an aryl alkane having at least two benzene rings spaced apart from one to two aliphatic carbon atoms, the total number of aliphatic carbon atoms in the molecule being from one to six.

4,967,040

SCREENED ELECTRIC CABLE PROVIDED WITH ZONES FOR RAPID PARALLEL CONNECTION

André Viaud, Crosne, and Francois Vaille, Corbeil, both of France, assignors to Societe Anonyme dite: FILOTEX, Draveil, France

Filed Dec. 12, 1989, Ser. No. 449,212

Claims priority, application France, Dec. 13, 1988, 88 16377

Int. Cl.[5] H01B 7/08, 7/36

U.S. Cl. 174—36 6 Claims

1. A multi-conductor electric cable comprising at least two insulated conductors, a metallic screen surrounding said conductors, each conductor being connectable in parallel to an electrical contact without cutting the cable, said connections being makable in predetermined zones of the cable, said zones being short relative to the distance between two successive zones, with all of the conductors in each zone being parallel to one another and contained in a plane, and wherein, in each connection zone said cable further comprises:

(a) an uninsulated conductor element in addition to said at least two insulated conductors, said uninsulated conductor element being in electrical contact with the screen of the electric cable at both ends of said connection zone, thereby providing electrical continuity for the screen from one end to the other of the connection zone and also making it possible to provide a parallel connection be-

tween the screening and an electrical contact, and wherein:

(b) the at least two insulated conductors and the uninsulated conductor element are disposed at precise and predetermined distances relative to one another, and

(c) the metallic screen is substantially devoid of the periphery of the cable, and wherein outside of said connection zones said metallic screen fully surrounds the conductors.

4,967,041

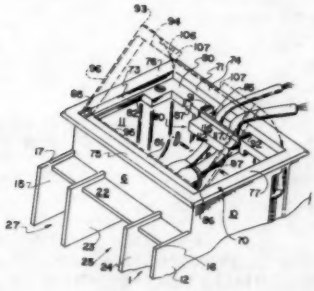
FLOOR BOX FOR ACCESS FLOORS

Timothy S. Bowman, Parkersburg, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.

Division of Ser. No. 95,437, Aug. 24, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 318,699

Int. Cl.[5] H02G *3/18*

U.S. Cl. 174—48 **11 Claims**



11. In a flush floor outlet fitting:

support means;

a retainer opening formed on said support means;

keyway means formed on opposite sides of said retainer opening;

wire retainer means including an elongated body having a blocking surface, a pair of spaced-apart side sections respectively extending outwardly from opposite ends of the body, key means extending outwardly respectively from said side sections and disposed respectively in said keyway means; and

said key and keyway means providing for said retainer means to be disposed in said retainer opening:

(a) with said blocking surface oriented to prevent passage of cable through said retainer opening; or

(b) with said blocking surface oriented to provide for the passage of cable through said retainer opening and to retain the cable in the retainer slot and prevent movement away from the support means into said access opening.

4,967,042

SYSTEM FOR ENHANCING CURRENT CARRYING CAPACITY OF PRINTED WIRING BOARD

Glen C. Shepherd; Dirk Warriner, and Charles F. Starks, all of Johnson City, Tenn., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 22, 1988, Ser. No. 289,332

Int. Cl.[5] H05K *1/00*

U.S. Cl. 174—250 **12 Claims**

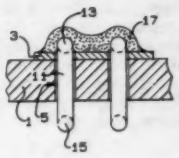
1. A printed wiring board system comprising:

(a) a printed wiring board having an electrical conductor on at least one surface thereof:

(b) at least one pair of adjacent apertures extending through said printed wiring board;

(c) an electrically conductive jumper extending through each said aperture and beyond the surfaces of said printed wiring board surrounding said apertures;

(d) the portions of said jumpers extending beyond said one



surface being positioned along the surface of said board and substantially parallel to said one surface; and

(e) solder disposed over essentially the entire portion of each of said jumpers extending beyond said one surface.

4,967,043

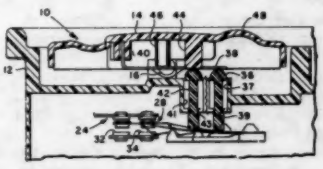
ABSORBING OVERTRAVEL IN SEQUENTIAL SWITCHING

Declan E. Killarney, Naperville, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 30, 1989, Ser. No. 358,280

Int. Cl.[5] H01H *9/00, 13/00*

U.S. Cl. 200—1 B **15 Claims**



9. A switch assembly comprising:

(a) housing means;

(b) an actuator member disposed for movement on said housing and including means defining a rigid contact surface and means defining a resiliently deflectable contact surface;

(c) a first switch means having a first movable blade member disposed on said housing means for actuation by said resilient contact surface;

(d) a second switch means having a second movable blade member disposed on said housing means for actuation by said rigid contact surface, wherein upon user movement of said actuator member, said first switch means and said second switch means are sequentially actuated, and said means defining said resilient contact surface absorbs overtravel by resilient deflection upon continued movement of said actuator member after actuation of said first switch means.

4,967,044

ELECTROMECHANICAL SWITCH

Gregg V. Speer, Bloomington; Donald L. Ray, Oaklandon, and Mark L. Petre, Pittsboro, all of Ind., assignors to Emhart Industries, Inc., Towson, Md.

Filed Sep. 23, 1988, Ser. No. 248,149

Int. Cl.[5] H01H *9/00*

U.S. Cl. 200—4 **8 Claims**

1. An electromechanical switch comprising:

a manually operable lever having a relatively long lever arm;

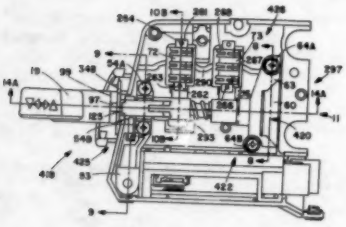
a low power electrical circuit including a conducting surface means for providing a plurality of different electrical

outputs when different portions of said surface means are electrically contacted;

an electrical contact;

low pressure contact force means for applying a low pressure force on said electrical contact in a first direction towards said electrical circuit to cause said electrical contact to engage said conducting surface means of said low power electrical circuit; and

switching force means responsive to said lever for applying a force on said electrical contact in a second direction, perpendicular to said first direction, to cause said electrical contact to move between different portions of said conducting surface means of said low power electrical circuit.



2. A switch as in claim 1 and further including housing means for supporting said manually operable lever, said low power electrical circuit, and said electrical contact, and wherein said switching force means comprises:

a main bearing assembly connecting said manually operable lever to said housing means, said main bearing assembly including a stop means for stopping the movement of said manually operable lever;

a mechanical switching assembly seperate from said main bearing assembly; and

transmission means for transmitting the movement of said lever to said mechanical switching assembly.

4,967,045

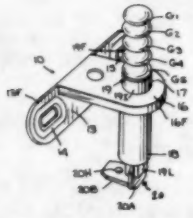
VERTICALLY-MOUNTABLE PIN SWITCH

Colin R. Keefer, Shavertown, Pa., assignor to Harrison Electronic Systems, Inc., Wilkes Barre, Pa.

Filed Jan. 2, 1990, Ser. No. 459,477

Int. Cl.[5] H01H *13/14*

U.S. Cl. 200—296 **6 Claims**



1. A normally-closed pin switch mountable on a vertical wall and adapted to open only when actuated by a movable closure member such as a door or automobile hood, said switch comprising:

(a) a conductive metal bracket formed by a generally rectangular mounting plate and a ledge cantilevered from an upper edge of the plate at a midsection of said upper edge, said ledge having a port therein and being in a horizontal plane when the bracket is mounted on the wall, said mounting plate and said ledge being each provided with a continuous peripheral flange to resist bending forces;

(b) a hollow conductive metal cylinder integral with the ledge and extending at right angles thereto, said cylinder having an upper end and a lower end, the upper end of the cylinder registering with the port, the lower end of the cylinder being partially closed to define a fixed contact having a slot therein; and

(c) a plunger rod of insulation material received in the cylinder, said rod having a cylindrical intermediate section whose diameter substantially matches the inner diameter of the cylinder whereby the rod is freely slidable therein, a lower section that extends through the slot and terminates in a movable contact, and an upper section extending above the port and terminating in a head which when engaged and pressed down by the closure member causes axial displacement of said rod to effect disengagement of the contacts to open the switch; and

(d) a spring housed in the cylinder that normally urges the movable contact into engagement with the fixed contact to close the switch.

4,967,046

AUTOMOTIVE CONTACT SWITCH ARRANGEMENT WITH ESSENTIALLY PLANAR SWITCH SPRINGS

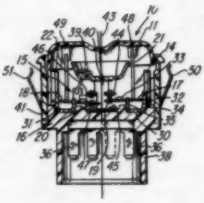
Wolfgang Priesemuth, Postkamp 13, 2210 Brittenburg-Nordoe, Fed. Rep. of Germany

Filed Jun. 22, 1989, Ser. No. 369,776

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1988, 3844484

Int. Cl.[5] H01H *21/36*

U.S. Cl. 200—339 **10 Claims**



1. In a contact switch that has two switch positions that are attainable from a rest or unoperated position via a movable rocker-type button, with said contact switch including a housing that also accommodates switching elements that include switch springs that are provided with switch contacts, the improvement comprising:

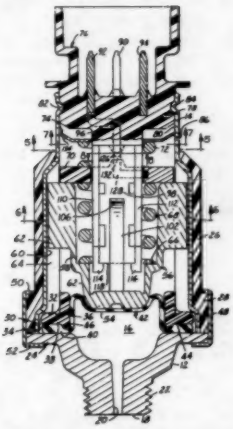
actuating elements that are articulatedly connected to said button and extend essentially perpendicular to said switch springs, with said actuating elements, as push members, acting upon said switch springs, which are essentially planar, each of said actuating elements being in the form of a small, flat plate, said housing being provided with guide means on opposite sides thereof, with said actuating elements being received in said guide means in such a way as to be displaceable in a direction essentially perpendicular to said switch springs.

4,967,047

SWITCH WITH POST-ASSEMBLY CALIBRATION ACCESS

Joseph T. Betterton, Arab; Thomas S. McKee, Madison, and Alfred H. Glover, Decatur, all of Ala., assignors to Acustar, Inc.

Filed Jan. 9, 1989, Ser. No. 294,460
Int. Cl.[5] H01H *35/34*
U.S. Cl. 200—83 J 10 Claims



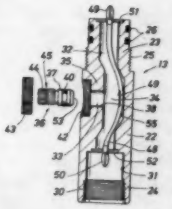
1. A switch structure in a fluid pressure transducer which permits calibration of the switch after assembly of the transducer whereby switch characteristics are set externally as the transducer is exposed to a test pressure, comprising: a hollow enclosure means with an apertured end adapted to be communicated with a fluid pressure system such as the lubrication system of a vehicle engine; diaphragm means with a peripheral edge attached to the enclosure means and with a flexible mid portion extending across the enclosure interior thereby separating the interior into first and second chambers, the first chamber communicated with the apertured end to receive pressurized fluid, the second chamber communicated with atmospheric pressure whereby a pressure force produced against the diaphragm means tends to move the diaphragm; a piston member supported in the second chamber for reciprocal motion in an axial direction toward and away from the enclosure's apertured end, the piston being operatively attached to the mid portion of the diaphragm means for movement therewith; an end cover member of the enclosure closing the enclosure end opposite the apertured end; insulated electrical conductor means extending through the end cover member and forming contact means in the second chamber; a first compression type coil spring engaging the piston at one end and extending toward the end cover member; a bridge member engaging the other end of the first spring on one end surface; a second compression type coil spring with one end engaging the opposite end surface of the bridge member and extending toward the end cover member; a fastener member with a peripheral edge frictionally engaging the enclosure means in a manner permitting sliding movement thereof away from the end cover member; the bridge member carrying an electrical conductor movable therewith to engage the contact means and complete a circuit from the conductor means whereby increased pressure in the first chamber causes the piston to compress the springs and move the conductor of the bridge member into contact with the contact means; opening means through the end cover member and axially aligned with the spring fastener so that externally operated elongated calibration means can be extended therethrough to move the spring fastener axially away from the end member to cause the bridge member and its conductor to move away from the contact means as the transducer is exposed to a test pressure.

4,967,048

SAFETY SWITCH FOR EXPLOSIVE WELL TOOLS

Thomas J. Langston, 503 Caliente, New Iberia, La. 70560

Continuation-in-part of Ser. No. 231,342, Aug. 12, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 483,355
Int. Cl.[5] E21B *43/116;* F42C *15/00;* H01H *35/38*
U.S. Cl. 200—334 27 Claims



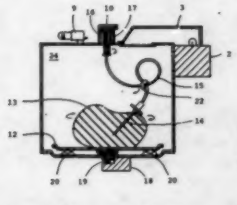
1. A safety switch apparatus for use in preventing accidental or premature detonation of an explosive well tool that is adapted to be suspended in a well on an armored electric cable, comprising: a hollow tubular body having a radial opening through the wall thereof; an insulated conductor extending through the interior of said body and adapted for providing the electrical connection between the armored electric cable and an explosive well tool, said conductor having a bare surface; contact means mounted on said body and arranged in operative association with said opening for movement between a first position engaging said bare surface to short said conductor to said body and thereby prevent accidental or premature detonation of the explosive well tool, and a second position disengaged from said bare surface to enable the explosive well tool to be fired.

4,967,049

ADJUSTING MEMBER FOR A TEMPERATURE SENSING PROBE

Tetuya Kaneshiro, Kashiwara, and Takeshi Tanabe, Higashiosaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 414,250, Sep. 29, 1989, abandoned, which is a continuation of Ser. No. 599,338, Apr. 12, 1984, abandoned, which is a continuation of Ser. No. 395,466, Jul. 6, 1982, abandoned, which is a continuation of Ser. No. 973,640, Dec. 27, 1978, abandoned, which is a division of Ser. No. 794,090, May 5, 1977, Pat. No. 4,149,056. This application Feb. 26, 1990, Ser. No. 485,811
Claims priority, application Japan, May 13, 1976, 51-54927; Jul. 27, 1976, 51-89859
Int. Cl.[5] H05B *6/78*
U.S. Cl. 219—10.55 B 3 Claims



1. A temperature-sensing assembly for use within an oven cavity comprising:

a temperature-sensing probe for sensing the temperature of a food product being cooked;

a plug means for providing an electrical connection between a control circuit for an oven and said temperature-sensing probe;

an elongated, flexible cable means having a predetermined diameter for connecting said temperature-sensing probe and said plug means, said elongated, flexible cable means includes a first end operatively connected to said temperature-sensing probe and a second end operatively connected to said plug means; and

a one piece, integral circular ring having a predetermined diameter substantially twice the diameter of said flexible cable means and defining a through hole having an inner peripheral surface for retaining an adjusted length of said elongated, flexible cable means between said temperature-sensing probe and said plug means for forming only a single loop which includes said ring so that said first end of said flexible cable means passes through said through hole of said ring in a first direction prior to operatively connecting said temperature-sensing probe to said first end and said second end of said flexible cable means passes through said through hole of said ring in a direction opposite to said first direction prior to operatively connecting said plug means to said second end wherein said flexible cable means passes through said through hole only twice and two points on said elongated, flexible cable means frictionally overlap each other within said through hole in said ring and two diametrically opposed points on said flexible cable means frictionally engaged said inner peripheral surface of said through hole to retain the relative adjusted positions between said temperature-sensing probe and said plug means, and for preventing separation of said ring from said elongated, flexible cable means, said loop is adjustable in size and the size of said loop is maintained by said ring;

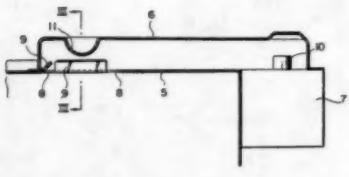
said temperature-sensing probe, said plug means and said cable means are operatively positioned for use within a microwave oven cavity and are constructed of a microwave permeable material.

4,967,050

HIGH FREQUENCY COOKING DEVICE WITH CEILING MOUNTED SEMI-SPHERICAL REFLECTOR

Kenzo Okamoto, Osaka, and Fumihiko Kitada, Neyagawa, both of Japan, assignors to Imanishi Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 124,648, Nov. 24, 1987, abandoned.
This application Sep. 1, 1989, Ser. No. 403,859
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.
Int. Cl.[5] H05B *6/74*
U.S. Cl. 219—10.55 F **2 Claims**



1. An electronic cooking appliance comprising;

(a) a microwave generator;

(b) a main body defining a cooking chamber arranged to receive objects to be heated;

(c) a waveguide connecting said microwave generator to said cooking chamber;

(d) a plurality of power supply openings formed in a wall common to said waveguide and said cooking chamber; and

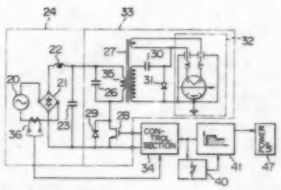
(e) a reflective device integrally protruding from a top wall of said waveguide and disposed centrally of said plurality of power supply openings, said device having a semi-spherical shape.

4,967,051

HIGH-FREQUENCY HEATING APPARATUS HAVING START CONTROL DEVICE FOR MAGNETRON POWER SUPPLY CIRCUIT

Naoyoshi Maehara, Nara; Haruo Suenaga, Kyoto; Kazuho Sakamoto, both of Kyoto; Takashi Niwa, Nara; Kimiaki Yamaguchi, Nara, and Takahiro Matsumoto, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 25, 1988, Ser. No. 223,949
Claims priority, application Japan, Jul. 27, 1987, 62-187124; Jan. 28, 1988, 63-18002
Int. Cl.[5] H05B *6/68*
U.S. Cl. 219—10.55 B **9 Claims**



1. A high frequency heating apparatus comprising:

electric power supply means selected from one of a commercial power supply, a battery and an electric generator;

an electric power converter having a semiconductor element for converting electric power supplied from said electric power supply means into high-frequency power;

control means for controlling the operation of said semiconductor element of said electric power converter;

electromagnetic wave radiation means connected to said electric power converter to receive the converted electric power therefrom for radiating an electromagnetic wave; and

start control means for producing a rise signal and supplying the rise signal to said control means at the start of an operation of said heating apparatus to increase the converted electric power, thereby increasing the electromagnetic wave output to a level higher than that in a steady operation state of said heating apparatus under a continuously operable maximum output producing condition.

4,967,052

MICROWAVE HEAT PIPE HEATING SYSTEM

Edward J. Krapf, 79 Middle St., Locust Dale, Pa. 17945

Filed May 21, 1990, Ser. No. 525,613
Int. Cl.[5] H05B *6/80*
U.S. Cl. 219—10.55 R **2 Claims**

1. A microwave heat pipe heating system which comprises:

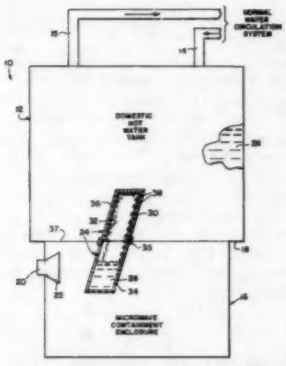
(a) a domestic hot water tank having a cold water inlet pipe and a hot water outlet pipe connected to a normal water circulation system;

(b) a microwave containment enclosure mounted to the underside of a bottom wall of said domestic hot water tank;

(c) a microwave generator having a wave guide for directing microwave beams into said microwave containment enclosure; and

(d) at least one sealed heat pipe having self contained water therein, said at least one sealed heat pipe extending from said microwave containment enclosure into said domestic

hot water tank so that the self contained water heated by the microwave beams will cause said at least one sealed heat pipe extending into said domestic hot water tank to heat water therein for the use in the normal water circulation system; wherein each of said at least one sealed heat pipe comprises a top portion made of a heat conductive metal extending through said bottom wall of said domestic



hot water tank; a protective coating applied onto the interior surface of said top portion to prevent microwave damage; a bottom portion made of microwave permeable material extending through the top wall of said microwave containment enclosure; and a connector sealing said top portion to said bottom portion to keep the self contained water therein.

4,967,053

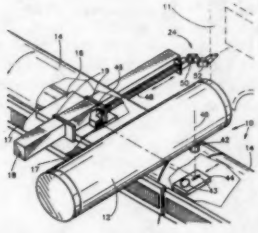
LASER SYSTEM

Roni Aharon, Ra'anana, Israel, assignor to F.I.A. Futurologie Industrielle Automation GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 2, 1989, Ser. No. 346,620

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.78 **18 Claims**



1. A laser system comprising:

laser means providing a laser beam along a fixed generally horizontal first axis;

means for redirecting said laser beam to impinge on a workpiece at a desired location thereon and including;

means disposed for rotation about and translation along said fixed generally horizontal first axis for redirecting said laser beam along a second axis;

laser head means arranged to receive said laser beam along said second axis and to cause it to impinge on said workpiece at said desired location; and

means for translating said laser head means along said second axis wherein said translation along said second axis is independent of translation along said first axis.

4,967,054

ELECTRIC-DISCHARGE-MACHINING POWER SOURCE

Haruki Obara, Toyama, and Syunzo Izumiya, Fujiyoshida, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

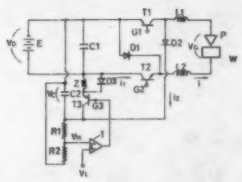
PCT No. PCT/JP89/00108, § 371 Date Jul. 3, 1989, § 102(e) Date Jul. 3, 1989, PCT Pub. No. WO89/07030, PCT Pub. Date Aug. 10, 1989

PCT Filed Feb. 2, 1989, Ser. No. 381,393

Claims priority, application Japan, Feb. 4, 1988, 53-22906

Int. Cl.[5] B23H *1/02*

U.S. Cl. 219—69.13 **1 Claim**



1. An electric-discharge machining power source including a workpiece, a tool having electrodes, and a discharge circuit, comprising:

electric power source means;

first switching means for permitting and prohibiting an application of an electric power voltage from said electric power source means between the workpiece and the tool electrode;

a first capacitor connected to be charged up to a voltage beyond said electric power voltage;

a return circuit, connected to said first capacitor, for returning a return electric current to said first capacitor to charge said first capacitor, said return electric current being generated due to presence of a stray inductance from the discharge circuit when the application of said electric power voltage is prohibited by said first switching means;

discrimination means for generating an output when it is determined that a charge voltage of said first capacitor exceeds a reference voltage;

a second capacitor connected in parallel with said electric power source means; and

second switching means for switching in response to the output from said discrimination means and interposedly arranged between said second capacitor and said return circuit and between said first capacitor and said return circuit,

an electric charge accumulated in said first capacitor is returned to said second capacitor when the charge voltage of said first capacitor exceeds said reference voltage.

4,967,055

PLASMA TORCH

Ty A. Raney, Valley Center, and Dale R. Bervig, Wichita, both of Kans., assignors to Tweco Products

Filed Mar. 31, 1989, Ser. No. 332,569

Int. Cl.[5] B23K *9/00*

U.S. Cl. 219—121.5 **19 Claims**

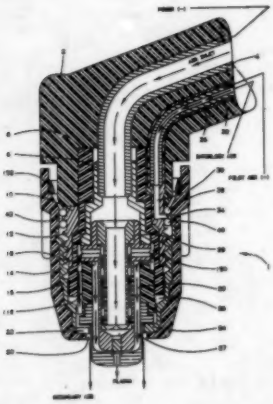
13. A removably elongated electrode for use in a plasma arc torch, said torch further including an electrically conductive seat, a trigger assembly, a compressed air source, a subassembly including a tip element with integral swirl ring and a nozzle comprising:

a. a elongated outer tube having a first open end and a second closed end;

b. an integral hollow elongated interior cooling tube sized to

fit inside of said outer tube forming an annular conduit between said interior cooling tube and said outer tube, said interior cooling tube having a first end and a second end, said first end of said interior cooling tube engaging and sealing with said first open end of said outer tube;

c. a radial shoulder positioned on the exterior of said outer tube, said shoulder having at least one port therein perforating said outer tube, said port in communication with said annular conduit; and



d. said radial shoulder engaging an electrically conductive seat when said electrode is assembled with said subassembly and said nozzle; and

e. said radial shoulder being blown out of engagement with said conductive seat by said compressed air source when said trigger is engaged and said electrode is assembled with said nozzle.

4,967,056

VEHICLE WINDOW HEATING APPARATUS

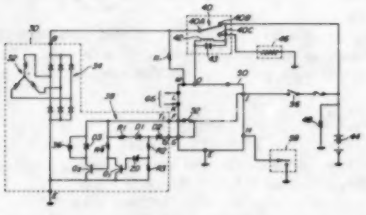
Yoshio Iwasa, Nagareyama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 22, 1989, Ser. No. 313,425

Claims priority, application Japan, Mar. 30, 1988, 63-74726

Int. Cl.[5] B60L *1/00*

U.S. Cl. 219—203 **12 Claims**



1. An apparatus for use with an automotive vehicle, said vehicle including a window, a vehicle battery, an internal combustion engine having a throttle valve, a transmission having selectable modes including at least neutral, park and drive, means for generating a DC voltage, said means including a voltage output terminal, an output winding and a field winding which rotates with respect to said output winding, and a voltage regulator for regulating current from said battery to said field winding, said apparatus comprising:

a resistive heating element which when connected to said voltage output terminal heats said window;

means for generating a demand signal indicative of a necessity for heating said vehicle window;

sensing means whose output signals indicate conditions of (a) said transmission being in one of either neutral and park, (b) said engine idling, and (c) said vehicle being at rest;

a control means for generating a command signal in response to said demand signal and said sensing means output signals;

a control circuit which in response to said command signal selects one of

(a) overriding said voltage regulator so as to provide an unregulated current path from said battery to said field winding such that generator output voltage is proportional to relative rotational velocity between said field winding and said output winding, connects said output voltage to said heating element and disconnects said output voltage from said battery and

(b) enabling said voltage regulator such that said voltage regulator regulates current from said battery to said field winding so as to maintain said voltage output at a predetermined value, connects said voltage output to said battery, and disconnect said voltage output from said heating element.

4,967,057

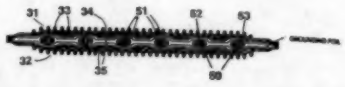
SNOW MELTING HEATER MATS

Ronald E. Bayless, 34 Gala Pl., Pagosa Springs, Colo. 81147, and James M. Havard, 12067 W. 62nd Ave., Arvada, Colo. 80004

Filed Aug. 2, 1988, Ser. No. 227,109

Int. Cl.[5] H05B *3/36*

U.S. Cl. 219—213 **21 Claims**



8. A heating mat for preventing the accumulation of snow or ice on a walkway comprising: a flat flexible mat casing having upper and lower surfaces, a flexible heating strip sealed within said casing, a first flexible electric cord entering an edge of the casing near a first side thereof and generally coplanar with the mat at said edge, a second electric cord entering the edge of the mat near an opposite side thereof, said cords being electrically connected to each other and to only one end of said heating strip within the mat casing, said first cord having a male electric plug thereon for connecting the heating strip to a source of power, said second cord having a female connector for connection to an electric plug like said male electric plug, the length of said second cord being less than the height of the riser of one stair step so that the female connector hangs above the next lower walkway surface when the mat is positioned on a walkway step.

4,967,058

POWER HEATING MEMBER

Mitsuki Yamazaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 12, 1989, Ser. No. 337,052

Claims priority, application Japan, Apr. 13, 1988, 63-88951; Apr. 28, 1988, 63-104061

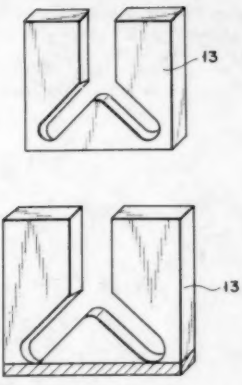
Int. Cl.[5] H05B *3/12*

U.S. Cl. 219—221 **15 Claims**

1. A heating member for processing an object in contact therewith by heat generated upon application of an electric current thereto, comprising:

a conductive heating substrate through which an electric current flows; and

an insulating layer formed at least at that portion of said substrate which is brought into contact with said object to



be processed and having a specific resistance not less than 100 times that of said conductive substrate.

4,967,059

ELECTRICAL SOLDERING GUN WITH HINGED SOLDERING JAWS HEATED BY A SINGLE HEATING ELEMENT

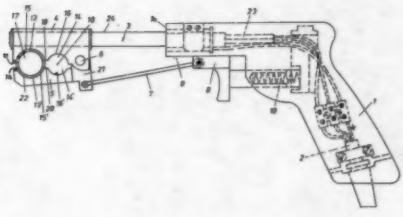
Rudolf Wagner, Stuttgart, Fed. Rep. of Germany, assignor to Rems-Werk Christian Föll und Söhne GmbH & Co., Stuttgart, Fed. Rep. of Germany

Filed Mar. 17, 1988, Ser. No. 189,300

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708587

Int. Cl.[5] H05B *1/00*; B23K *3/04, 1/12*

U.S. Cl. 219—230 **10 Claims**



1. An electrical soldering device for pipes comprising:

a housing having an overall configuration like a pistol;

a single elongated heating element connected to said housing in a location extending longitudinally thereof;

a first soldering jaw that is disposed on said heating element and extended axially of said heating element in heat exchange relationship therewith and is provided with first recess means for receiving pipes therein to be soldered;

a second soldering jaw that is hingedly connected directly to said first soldering jaw per se for heat transmittal where hingedly connected between said first and second jaws and is provided with second recess means also for receiving pipes therein to be soldered, with said first and second recess means cooperating, in a gripping position of said second soldering jaw, to form complementary receiving means for a pipe that is to be soldered;

a control member that is movably mounted on said housing; and

a connecting element that is connected directly at opposite ends thereof both to said second soldering jaw and also to said control member, biasing means operatively associated with at least one of said control member, connecting element and second jaw for normally biasing said second jaw toward said first jaw to maintain said second jaw in its gripping position to hold the pipe to be soldered, said second jaw being selectively movable away from said first jaw by actuating of said control member to cause said connection element to pivotally move said second jaw.

4,967,060

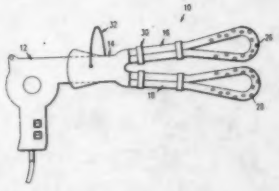
FOOTWEAR DRYER ADAPTER FOR USE WITH HAND-HELD BLOW DRYER

Richard Lomeli, 798 Vasona, Milpitas, Calif. 95035

Filed Jan. 13, 1989, Ser. No. 297,462

Int. Cl.[5] F24H *9/00*

U.S. Cl. 392—384 **8 Claims**



1. A drying device for use with a hand-held blow dryer comprising:

an adapter portion having an air inlet opening and at least one air outlet opening, said air inlet opening being frustum shaped so as to accept insertion of an air outlet nozzle of a hand-held blow dryer and provide a snug fit between said nozzle and said adapter portion; and

at least one flexible hose connected to receive air from said at least one air outlet opening of said adapter portion,said flexible hose having a plurality of holes to allow passage of air therethrough,

wherein said at least one flexible hose is bent in a U-shape, and terminal portions of said U-shaped flexible hose are connected to receive air from said at least one air outlet opening of said adapter portion.

4,967,061

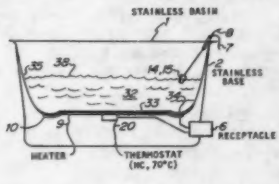
HEATED BASIN

Jaroy Weber, Jr., Woodside; Terrance L. Kloeckl, San Francisco; Michael A. Kast, Palo Alto; Frank T. Watkins, III, Menlo Park, and Anthony Chan, Los Altos, all of Calif., assignors to Sonne Medical, Inc., Palo Alto, Calif.

Filed Oct. 10, 1989, Ser. No. 418,542

Int. Cl.[5] H05B *3/72*

U.S. Cl. 219—438 **1 Claim**



1. Apparatus for heating a liquid comprising:

a basin for holding a liquid, the basin having a bottom portion and a side wall portion, and the bottom portion hav-

ing a non-planar shape including a central elevated region and a depressed edge region of thicker material than the material in the central elevated region;

a heater assembly attached to the underside of the basin bottom for providing greater heat in the central region of the basin bottom than along the edge region of the basin bottom;

a base fixedly attached to the side wall portion of the basin spaced away from the heater assembly on the basin bottom; and

means for supplying and controlling electrical current through the heater assembly for heating liquid in the basin substantially in the central elevated region and additionally in the edge region of the basin to produce convective circulation of liquid in the basin.

4,967,062

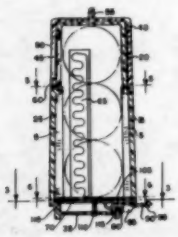
GOLF BALL HEATING DEVICE

Wilburt Cohen, Yorktown Heights, N.Y., assignor to Advanced Golf Concepts, Inc., Tarrytown, N.Y.

Filed Dec. 8, 1989, Ser. No. 447,977

Int. Cl.[5] H05B *3/34*

U.S. Cl. 219—521 **21 Claims**



1. A golf ball heating device comprising an elongated housing having a lower portion, an upper portion and an interior space for retaining a plurality of golf balls therein in a generally axial position, said housing also facilitating the flow of heated air around the balls, and including at least one aperture positioned on a side of the housing in the upper portion thereof for insertion and removal of the balls into and out of said interior space;

means for heating air located in said housing at a predetermined spaced distance from the balls; and

a lid member operatively associated with said housing aperture and movable between a first position, where said lid member closes said housing aperture, and a second position where access to said interior space through said aperture is provided to allow insertion or removal of the balls into or out of said interior space.

4,967,063

CHARGE CONTROLLED ADAPTIVE-OPTICS SYSTEM

Charles C. P. Wang, Rancho Palos Verdes, and Patrick L. Smith, Redondo Beach, both of Calif., assignors to The Aerospace Corporation, El Segundo, Calif.

Filed Jun. 16, 1988, Ser. No. 207,676

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.1 **10 Claims**

1. An adaptive-optics system for nulling phase distortion in a wavefront of a propagating wave, which is incident on an optical element, the system comprising:

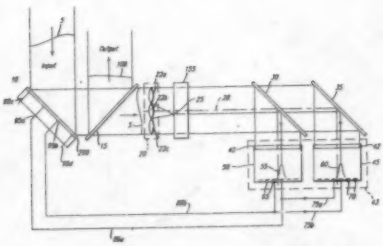
lenslet array-type sensor means for receiving the wavefront and generating a plurality of light points indicative of wavefront tilt at a plurality of locations on the wavefront;

image intensifier means for amplifying the light points;

compensation means for computing and superimposing compensation signals on the light points, thereby producing a plurality of calibrated light points;

electron beam generating means for converting the calibrated light points into a plurality of electron beams, the electron beams varying in intensity in relation to the calibrated light points and impinging a plurality of collectors within the generating means; and

wherein said optical element is a selectively deformable mirror including a monolithic piezoelectric wafer, a mirror surface adhered to a first side of the piezoelectric wafer, and a plurality of selectively chargeable electrodes mounted in the piezoelectric wafer, whereby receipt of the electron beams of varying intensity upon the collectors results in selective charging or discharging of the electrodes, thereby selectively deforming the piezoelectric wafer and the mirror surface adhered thereto to null the phase distortion in the wavefront incident on the mirror surface.



4,967,064

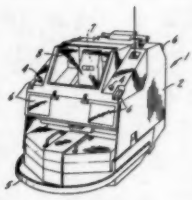
METHOD AND APPARATUS FOR A TARGET DETERMINING APPARATUS HAVING INCREASED RANGE

Bruce F. Field, Minneapolis, and Paul C. Hunt, Brainerd, both of Minn., assignors to Tennant Company, Minneapolis, Minn.

Filed Jun. 30, 1989, Ser. No. 374,478

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—203.2 **48 Claims**



1. A target determining apparatus, comprising:

a semiconductor light source at a first location, the light source having a power rating such that the emitted power of the apparatus is no more than 1 milliwatt;

means for modulating the light source in a predetermined manner;

at least one retroreflective target adapted to be at a second location to reflect light from the light source back toward said first location;

aiming means for directing a light beam from the light source to the target;

a photoreceptor located at the first location so as to be responsive to reflected light from the target;

demodulating means for demodulating photoreceptor sig-

nals in accordance with said predetermined manner so as to pass only signals having characteristics corresponding to the means for modulating; and

amplifying means for amplifying the signal from the photoreceptor an amount sufficient to create a peak signal of at least 0.6 volts from light reflected from a six-inch wide target about 65 feet from the first location.

4,967,065

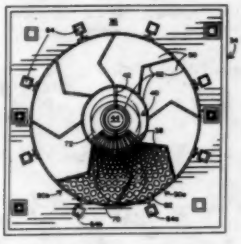
INTEGRATED RETICLE AND DETECTOR

Byron Edwards, Orange, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Aug. 11, 1989, Ser. No. 392,676

Int. Cl.[5] G01J *1/20*; F41G *7/00*

U.S. Cl. 250—203.6 **6 Claims**



1. An integrated reticle and detector assembly, comprising:

(a) a gimbaled platform having a platform axis;

(b) a telescope having an optical axis, said telescope being mounted on said platform for rotation about said platform axis, the optical axis of said telescope being spaced from said platform axis;

(c) a detector fixedly mounted on said platform to receive images from said telescope; and

(d) stationary reticle means for obscuring portions of said detector, said reticle means being fixedly positioned with respect to said detector in the optical path of said telescope between said telescope and said detector;

(e) said detector being divided into an annular central segment and an annulus of separate outer segments, each of said segments being capable of producing a separate output signal when illuminated;

(f) the center of said central segment being on said platform axis so that the image of a target located on the optical axis of said telescope describes a circle concentric with said central segment upon rotation of said telescope, and

(g) said outer segments being so positioned as to be illuminated by the image of a target substantially off the optical axis of said telescope,

(h) whereby said outer segments produce a signal indicative of the direction and distance in which said image is off said optical axis.

4,967,066

METHOD AND SYSTEM FOR INCREASING THE EFFECTIVE DYNAMIC RANGE OF A PHOTOSENSOR

J. Angelo Beraldin, Ottawa, and Francois Blais, Orleans, both of Canada, assignors to National Research Council Canada/Conseil National De Recherches Canada, Ottawa, Canada

Filed Oct. 5, 1989, Ser. No. 417,492

Claims priority, application Canada, Oct. 19, 1988, 580652

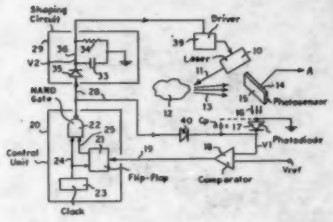
Int. Cl.[5] G01J *1/32*

U.S. Cl. 250—205 **7 Claims**

2. A system for use in apparatus having a source of light for illuminating an object and a photosensor for detecting light reflected by such object; said system being for increasing the effective dynamic range of said photosensor and comprising

(a) a saturation detector mounted to receive an amount of light proportional to the light received by the photosensor for generating a saturation signal when the integral of said amount of light over each of a series of measuring time periods has reached a predetermined value,

(b) means for de-energising said source and resetting said saturation detector upon the occurrence of whichever is



the earlier of termination of a said period and receipt of such a saturation signal, and

(c) means for re-energising the source at the commencement of a subsequent said time period in a manner to gradually increase the intensity of the light emitted by said source.

4,967,067

SIGNAL READ-OUT CIRCUIT WHICH LOWERS DIFFUSION CAPACITANCE BY LIMITING EMITTING CURRENT WITH RESISTIVE ELEMENTS

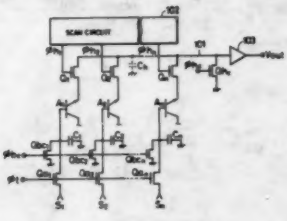
Seiji Hashimoto; Tamotsu Satoh, and Shigetoshi Sugawa, all c/o Canon Kabushiki Kaisha: 30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo, Japan

Continuation of Ser. No. 133,384, Dec. 15, 1987, abandoned. This application Jun. 9, 1989, Ser. No. 364,493

Claims priority, application Japan, Dec. 28, 1986, 61-302211; May 25, 1987, 62-125924

Int. Cl.[5] H01J *40/14*

U.S. Cl. 250—208.1 **16 Claims**



1. An image pickup apparatus comprising:

a plurality of photoelectric conversion cells for producing electrical signals in response to incident light:

a plurality of storage means for simultaneously reading out signals from said conversion cells and temporarily storing the signals;

a plurality of first amplifiers for amplifying outputs of said plurality of storage means;

a plurality of resistor means, having resistance values, for restricting outputs of said plurality of first amplifiers;

scanning means for changing the resistance values of said plurality of resistor means in order; and

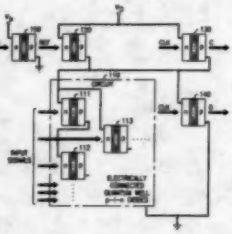
a second amplifier for commonly amplifying the signals provided by said plurality of first amplifiers through said plurality of resistor means.

4,967,068

SINGLE-ENDED OPTICAL LOGIC ARRANGEMENT

Anthony L. Lentine, St. Charles, and David A. B. Miller, Fairhaven, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 28, 1989, Ser. No. 399,638
Int. Cl.[5] H01J 40/14
U.S. Cl. 250—213 A 22 Claims



1. Apparatus comprising

means for generating an optical output beam, and

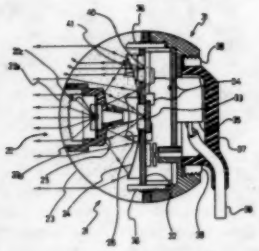
a plurality of photodetector means interconnected to form an electrical circuit for electrically controlling said generating means, said circuit corresponding to a logic function comprising at least two operations from the group of logic operations consisting of AND, OR, NAND, and NOR, said circuit being connectable to a voltage source and responsive to a plurality of optical signal beams each incident on at least one of said photodetector means such that said circuit controls the generation of said optical output beam at a first logic value when said logic function of said plurality of optical signal beams is a first value, and at a second logic value when said logic function of said plurality of optical signal beams is a second value.

4,967,069

SPHERICAL PHOTOELECTRIC SENSOR

Masami Yamakawa, Kenei Hakuyoudai Apt. 14-301, Kashiocho, Totsuka-ku, Yokohama-shi, Japan

Filed Dec. 14, 1988, Ser. No. 284,199
Claims priority, application Japan, Aug. 2, 1988, 63-193301
Int. Cl.[5] G01B 21/00
U.S. Cl. 250—221 12 Claims



1. A spherical photoelectric sensor comprising: a semisherical optical body including a light transmitting means having a light transmitting lens, and a light receiving lens means; and a semispherical electronic circuit block including a light receiving element, a circuit substrate and electronic circuit parts;

said light transmitting means being formed in a recess of a semispherical transparent lens body and including: a casing having a light emitting element on its bottom; and a light transmitting lens fitted in said casing and having a surface communicated with a surface of said semispherical transparent lens body;

said light receiving lens means including: said semispherical transparent lens body; a concave mirror formed at an opposite side of an outer surface of said transparent lens body; a convex mirror formed on an outer bottom of said casing so as to oppose to said concave mirror; and a light collecting lens formed on a center of said concave mirror; and

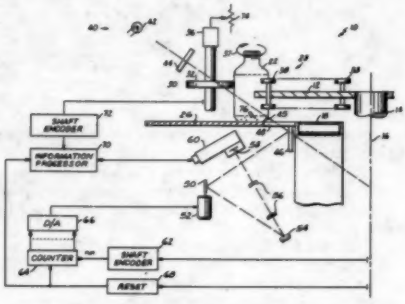
the light collected by said light collecting lens being received by said light receiving element in said electronic circuit block.

4,967,070

INDENTIFICATION OF A MOLDED CONTAINER WITH ITS MOLD OF ORIGIN

James A. Ringlien, Maumee, Ohio, and Dennis L. Brower, Sand Creek, Mich., assignors to Owens-Brockway Glass Container Inc., Toledo, Ohio

Filed Jul. 19, 1989, Ser. No. 381,883
Int. Cl.[5] G01N 9/04; G06K 5/00
U.S. Cl. 250—223 B 10 Claims



1. Apparatus for reading a code on a molded container indicative of mold of origin, said code comprising a plurality of surface irregularities extending in an arcuate array around a selected portion of the container concentrically with the container axis, said apparatus comprising:

a conveyor for sequentially moving a series of containers in an arcuate path about a fixed conveyor axis in a continuous uninterrupted motion to and through a reading station,

means for rotating each container about its axis as the containers pass in turn through the reading station,

a light source that includes means for imaging said light source at said conveyor axis through the selected portion of a container at said reading station, said light source being positioned on a side of said path remote from said axis and directing light energy toward containers in said path at an acute angle to said axis,

a camera,

a scanning mirror optically positioned at said conveyor axis to receive at said acute angle an image of said light source transmitted through the selected portion of the container at said reading station and to reflect such image onto said camera, and means coupled to said conveyor to rotate said scanning mirror about an axis parallel to said conveyor axis in synchronism with motion of said conveyor so as to reflect onto said camera an image of that circumferential section of the container selected portion closest to said conveyor axis, and

means coupled to said camera for reading codes of containers as a function of variations in light energy incident on said camera as the code irregularities on the selected

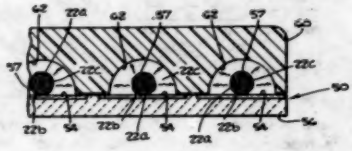
portions of a container at said reading station sweep said image.

4,967,071

FIBER OPTIC POSITION SENSOR

Kyong Park, Thousand Oaks; Marcos A. Nassar, Los Angeles, and Cliff C. Sun, Simi Valley, all of Calif., assignors to Kavlico Corporation, Moorpark, Calif.

Filed Mar. 10, 1989, Ser. No. 322,418
Int. Cl.[5] H01J 5/16
U.S. Cl. 250—227.21 5 Claims



1. An optical detector for sensing one of a presence or an absence of optical energy in an optical fiber, said optical fiber having a core through which said energy propagates, a cladding surrounding said core and a coating surrounding said cladding, said detectors comprising:

a sharp bend in said optical fiber at a selected location thereof, said optical energy being transferred from said core into said cladding and further transferred to said coating subsequent to propagating through said bend and scattered externally of said coating at said selected locations;

a semiconductor substrate having an upper surface;

a photodiode fabricated in said top surface of said semiconductor substrate, said substrate being arranged such that said photodiode is disposed adjacent said fiber at said selected location, said photodiode developing an electrical signal in response to optical energy being incident thereon; and

a plate juxtaposed said upper surface, said plate having a semicircular channel, said fiber being received through said channel, said channel reflecting and focusing external optical energy toward said photodiode.

4,967,072

INTERFEROMETRIC ROTATING CONDITION DETECTION APPARATUS

Tetsuharu Nishimura, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

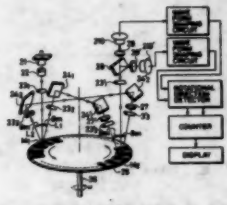
Continuation of Ser. No. 393,104, Aug. 3, 1989, abandoned, which is a continuation of Ser. No. 315,236, Feb. 23, 1989, abandoned, which is a continuation of Ser. No. 770,753, Aug. 29, 1985, abandoned. This application Feb. 20, 1990, Ser. No. 481,684

Claims priority, application Japan, Sep. 5, 1984, 59-186170; Sep. 5, 1984, 59-186171; Sep. 5, 1984, 59-186172; Sep. 5, 1984, 59-186173; Sep. 10, 1984, 59-189154; Sep. 10, 1984, 59-189156; Sep. 10, 1984, 59-189157; Sep. 25, 1984, 59-200175
Int. Cl.[5] G01D 5/34
U.S. Cl. 250—231.16 44 Claims

39. A rotation condition detecting apparatus comprising:

optical means for directing a radiation beam to a diffraction grating formed on a rotating body along a rotary direction thereof, said optical means illuminating the diffracting grating with the radiation beam in a direction substantially perpendicular to a radial direction of the rotating body, with the radiation beam having a long and narrow shape in the rotary direction;

light receiving means for photoelectrically converting an interference fringe formed by diffracted lights of predetermined orders emitting from the diffraction grating; and



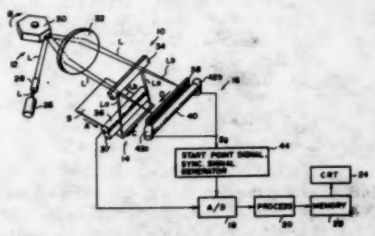
detecting means for detecting a rotating condition of the rotating body on the basis of a signal from said light receiving means.

4,967,073

LIGHT SCANNING DEVICE HAVING A SYNCHRONIZING GRID WITH A PHASE-DETECTED STARTING POINT AREA

Ono Shuji; Tsutomu Kimura, both of Kanagawa, and Yoshimi Takasaki, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 314,230, Feb. 21, 1989, abandoned, which is a continuation of Ser. No. 39,842, Apr. 20, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 416,559
Claims priority, application Japan, Apr. 18, 1986, 61-90544
Int. Cl.[5] G02B 26/10; H01J 3/28
U.S. Cl. 250—235 4 Claims



1. A light scanning device for two-dimensionally scanning an object surface by scanning the object surface in a main scanning direction with a scanning light beam while moving the object surface in a direction substantially normal to the main scanning direction, comprising:

a light source for emitting the scanning light beam;

a light deflector for reflectively deflecting the light beam in the main scanning direction;

means for deriving a synchronizing light beam from said light beam reflectively deflected by said light deflector;

a grid extending in said main scanning direction for receiving said synchronizing light beam; and

means for detecting light from said grid to detect the position of said scanning light beam in said main scanning direction on the object surface;

said grid defining a linear array of alternate, relatively light and dark bars disposed at a constant pitch with the exception of a starting point control area inwardly spaced from an end of the array, said starting point control area defining a sharp irregularity relative to said constant pitch corresponding to a main scanning cycle starting position on the object surface, said irregularity modulating the synchronizing light beam applied to the grid so that light having passed through the starting point control area will

have a different phase corresponding to said irregularity relative to said constant pitch than the light from the other portion of said grid.

4,967,074

SCANNER FOR THE DETECTION OF BAR CODES ON ARTICLES

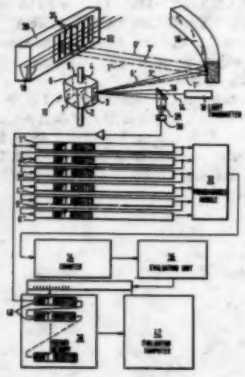
Walter von Stein, Waldkirch, Fed. Rep. of Germany, assignor to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Fed. Rep. of Germany

Filed Aug. 19, 1988, Ser. No. 234,711

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1987, 3728211

Int. Cl.[5] H01J 3/14

U.S. Cl. 250—236 16 Claims



1. Scanner for the detection of bar codes on articles, the scanner comprising:

a light transmitter for radiating light onto a rotating mirror wheel for the linewise scanning of an article, wherein the mirror wheel includes an axis of rotation and a plurality of mirror surfaces of different inclination relative to the axis of rotation, the surfaces for projecting the light onto the article in parallel scanning lines;

an optical system for picking up the light scattered back by the article and transferring it to a photodetector; and

an electronic processing unit which processes the output signal of the photodetector, said electronic processing unit comprising:

a memory in which the output signal of the photodetector is stored;

an electronic evaluation circuit including a programmable, fast, pre-evaluation stage for accessing the memory and identifying a signal component which originates from a bar code detected by the scanning lines with reference to the signal stored for several scanning lines by the memory containing the same information at addresses associated with the same scanning point or with adjacent scanning points;

means for picking the signal component out for further signal processing; and

at least one slower evaluation computer for analyzing the bar code information.

4,967,075

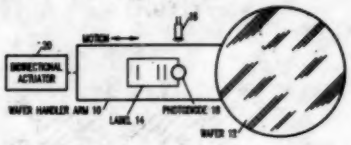
VELOCITY MONITORING METHOD AND APPARATUS

Peter G. Borden, Palo Alto, Calif., assignor to High Yield Technology, Mountain View, Calif.

Continuation of Ser. No. 908,058, Sep. 16, 1986, abandoned. This application Apr. 21, 1988, Ser. No. 186,685

Int. Cl.[5] H01J 3/14

U.S. Cl. 250—237 G 7 Claims



1. A method of monitoring the velocities of a carrier that is movable repetitively and bidirectionally, and wherein said carrier incorporates a plurality of markings that are unequally spaced comprising the steps of:

sensing the times between the passage of consecutive markings as said carrier is moved between two positions;

recording values representative of the velocities of said carrier during a plurality of cycles of motion, said values representing the sensed times and the distances between consecutive markings:

determining a normal range of velocities when said carrier and its actuator are functioning properly:

comparing the recorded values representing measured velocities to values representing said normal range of velocities: and

providing a warning signal when said measured velocities differ significantly from said normal range of velocities.

4,967,076

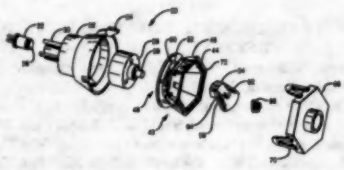
OPTICAL SCANNER PRODUCING MULTIPLE SCAN PATTERNS

Chris A. Schuhmacher, San Antonio, Tex., and Rex A. Aleshire, Byesville, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 8, 1989, Ser. No. 447,935

Int. Cl.[5] H01J 3/14

U.S. Cl. 250—236 17 Claims



1. An apparatus for projecting scanning beams at coded indicia comprising:

a source of scanning light beams;

means for directing the scanning light beams along a first light path;

means mounted in said first light path for deflecting the light beams along a plurality of second light paths;

rotatably mounted reflecting means mounted in each of said second light paths for reflecting the light beams along a third light path which scans coded indicia, said third light paths forming a first scanning pattern; and

actuating means engaging each of said reflecting means for rotating each of said reflecting means with respect to said second light paths enabling the reflecting means to reflect the light beams along a plurality of fourth light paths

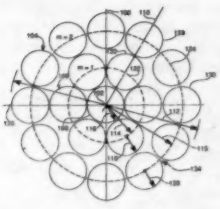
forming a second scanning pattern for scanning the coded indicia.

4,967,077

MULTIPLE APERTURE ARRAYS FOR OPTICAL AND RADIO FREQUENCY SIGNALS

Steven M. Watson, Fairborn, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 9, 1989, Ser. No. 349,012
Int. Cl.[5] N01J *40/14*
U.S. Cl. 250—237 R 20 Claims



1. Electromagnetic wave generating multiple aperture apparatus comprising the combination of:

a centrally located circular aperture of predetermined diameter d, said centrally located aperture being centered at the origin of a coordinate axis set;

a sextet of additional circular apertures each of diameter d and centered on a first circle concentric of said origin and said first aperture with each first concentric circle aperture being in substantial contiguity with said first aperture and with the laterally adjacent first concentric circle apertures, said sextet of first concentric circle apertures being also disposed along equally spaced radial vectors originating in said origin and intercepting said first circle at six equal arc intervals;

a plurality of additional circular apertures each of diameter d disposed along subsequent circles, with each subsequent circle aperture being in substantial contiguity with the adjacent most aperture of the preceding concentric circle and with the radially adjacent subsequent concentric circle apertures, said subsequent circle apertures being disposed along equally spaced radial vectors originating in said origin and intercepting said subsequent circle at equal arc intervals with said subsequent concentric circles being N in number and with the number of apertures in each said subsequent concentric circle being six greater than the number in the preceding concentric circle and with the total number of apertures being a number taken from the series 19, 37, 61, 91, 127 and so forth, in response to the number N of subsequent concentric circles.

4,967,078

RUTHERFORD BACKSCATTERING SURFACE ANALYZER WITH 180-DEGREE DEFLECTING AND FOCUSING PERMANENT MAGNET

Kenneth H. Purser, Lexington, Mass., assignor to Genus, Inc., Mountain View, Calif.

Filed Feb. 2, 1990, Ser. No. 474,476
Int. Cl.[5] H01J *37/252;* H05H *5/06*
U.S. Cl. 250—309 1 Claim

1. A Rutherford backscattering surface analyzer comprising in combination:

a hollow electrode,

a voltage source for impressing upon said hollow electrode a positive voltage of the order of 10^6 volts,

a first acceleration tube connected between said voltage source and ground,

a second acceleration tube connected between said voltage source and ground,

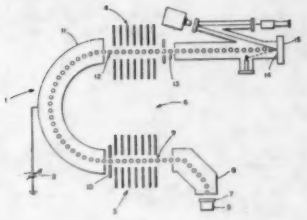
a deflecting magnet within said terminal having pole pieces between which is supported an evacuated region connecting said acceleration tubes to each other,

a source of positive helium ions,

a lithium charge-exchange canal,

means for analyzing said helium ions and directing them into said canal,

an electron stripper within said terminal,



said magnet being adapted to direct said stripped ions into said second acceleration tube for acceleration therethrough,

a sample holder for holding a sample to be analyzed in the path of the ions emerging from said second acceleration tube, and

means for analyzing the energy and yield of helium ions backscattered from said sample,

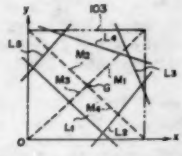
said magnet including permanently magnetized members producing a magnetic flux of a least 3000 gauss and having a magnetic hardness no less than that of samarium cobalt.

4,967,079

METHOD OF RECOGNIZING IRRADIATION FIELD

Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 18, 1988, Ser. No. 182,685
Claims priority, application Japan, Apr. 16, 1987, 62-93633
Int. Cl.[5] H04N *5/32*
U.S. Cl. 250—327.2 1 Claim



1. A method of recognizing an irradiation field on a stimulable phosphor sheet bearing radiation image information recorded thereon by limitation of the irradiation field when the stimulable phosphor sheet is exposed to stimulating rays and light emitted by the stimulable phosphor sheet upon stimulation is photoelectrically read out to obtain image signals representing the radiation image information borne by the stimulable phosphor sheet, the method comprising steps of:

obtaining digital image data for a plurality of positions on the stimulable phosphor sheet from the image signals;

detecting prospective edge points, which are considered to be edge portions of the irradiation field on the stimulable phosphor sheet, on the basis of the image data of positions radially outwardly arranged in a plurality of directions from a predetermined point inside the irradiation field.

wherein said predetermined point is not one of said prospective edge points; and 'recognizing as the irradiation field the region surrounded by the lines passing through the prospective edge points.

4,967,080

APPARATUS FOR MEASURING THE TEMPORAL CORRELATION OF FUNDAMENTAL PARTICLES

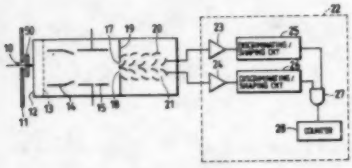
Tsuneyuki Urakami, and Yoshihiro Takiguchi, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 19, 1988, Ser. No. 246,106

Claims priority, application Japan, Sep. 18, 1987, 62-235365; Sep. 18, 1987, 62-235366

Int. Cl.[5] G01T *1/29*

U.S. Cl. 250—336.1 **10 Claims**



1. An apparatus for measuring the temporal correlation of fundamental particles comprising:

sweep means for sweeping the fundamental particles or images thereof;

extracting means for time-divisionally extracting the swept fundamental particles or the images thereof, including an aperture member having at least two apertures, the fundamental particles or images thereof being time-divisionally extracted through said apertures, said apertures being formed so that the distance therebetween varies in a given direction;

multiplication means for multiplying each of the extracted fundamental particles or the images thereof; and

correlation means for performing correlating arithmetic operations on the basis of each output signal from said multiplication means.

4,967,081

INFRARED DETECTOR

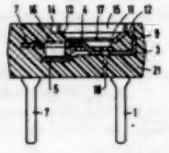
Reiner Quad, Taunusstein; Udo Ringelstein, Lorch; Fred Plotz, Wiesbaden, and Gerhard Knaup, Lorsch, all of Fed. Rep. of Germany, assignors to Heimann GmbH, Fed. Rep. of Germany

Filed Jun. 15, 1989, Ser. No. 366,613

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1988, 8808109[U]; Jul. 8, 1988, 8808815[U]

Int. Cl.[5] H05K *9/00*; G01J *5/04*

U.S. Cl. 250—338.1 **3 Claims**



1. An infrared detector comprising:

an infrared detector element;

an electrical component used in combination with said infrared detector element to provide a signal corresponding to infrared radiation incident on said infrared detector element;

a one-piece shaped sheet metal element having a plurality of projections disposed in mechanical contact with said infrared detector element and said electrical component to electrically connect said infrared detector element and said electrical component;

an infrared filter; and

a shaped plastic housing in which said infrared detector element, said electrical component and said sheet metal element are embedded with a portion of said plurality of projections extending outside of said housing to form terminal pins for said infrared detector, said housing having an opening therein with stepped walls which hold said infrared detector element and said infrared filter with said infrared detector element disposed behind said infrared filter at a fixed location.

4,967,082

TEMPERATURE COMPENSATED THERMAL RADIATION DETECTORS

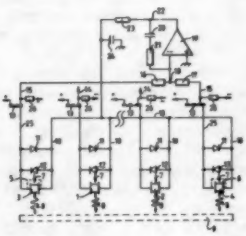
Martin E. Cooke, Salisbury, United Kingdom, and Andrew A. Turnbull, Reigate, England, assignors to U.S. Philips Corp., New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,580

Claims priority, application United Kingdom, Apr. 22, 1988, 8809593

Int. Cl.[5] G01J *5/06*

U.S. Cl. 250—338.3 **6 Claims**

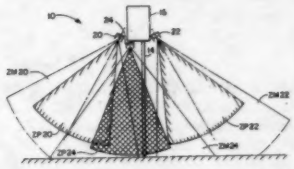


1. Thermal radiation detection apparatus comprising a first high impedance thermal radiation detector element shunted by a low leakage device, said detector element being disposed on a mount and placed to receive radiation from a scene and thereby change in temperature and produce an output signal between two terminals on the element, one terminal of the detector element being connected to an output, and a reference low leakage device, one terminal of which is connected via a high gain negative feedback loop to the other terminal of the reference low leakage device and also to the other terminal of the detector element via a common line, characterised in that the reference low leakage device is shunted by a reference radiation detector element nominally identical to the first radiation detector element and disposed on the mount adjacent the first radiation detector element, the reference element being shielded from scene radiation, whereby ambient temperature changes affect both the detector and reference elements equally and hence the reference element output caused by ambient temperature changes substantially compensates, via the feedback loop, the detector element output caused by the ambient temperature changes.

4,967,083
DOOR SENSOR SYSTEM

Henning N. Kornbrekke, Burlington, and Leon Boiucaner, Farmington, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Apr. 14, 1989, Ser. No. 337,944
Int. Cl.[5] E05F *15/20*
U.S. Cl. 250—341 29 Claims

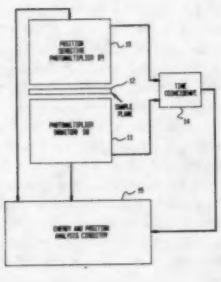


1. A sensor system for an automatic door system comprising:
a plurality of sensor units, each said sensor unit comprising:
transmitter means for emitting infrared radiation so as to define a detection zone Zd;
receiver means for receiving reflected radiation from zone Zd;
presence zone means for defining a presence zone Zp in said zone Zd;
motion zone means for defining a motion zone Zm in said zone Zd;
detection logic means responsive to said receiver means for detecting the presence of a foreign object in zone Zp and the motion of a foreign object in zone Zm and generating a detection signal indicative thereof;
hold open output means responsive to said detection output signal for generating a hold open output signal for a pre-established time interval;
synchronization means for synchronizing the operation of said sensor units; and
mounting means for mounting said sensor units so that at least a pair of said zones Zp intersect.

4,967,084
MULTI-SAMPLE SCINTILLATION COUNTER USING POSITION-SENSITIVE DETECTOR

Arthur Rich, Ann Arbor; Ralph S. Conti, Ypsilanti, and Bernard W. Agranoff, Ann Arbor, all of Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Filed Feb. 2, 1989, Ser. No. 305,873
Int. Cl.[5] G01T *1/28*
U.S. Cl. 250—361 R 20 Claims



1. An arrangement for monitoring a multiplicity of detectable events in a sample, the sample being characterized by a substantially two-dimensional surface distribution of the detectable events, the arrangement comprising:
sample holder means for holding the sample in a predetermined orientation whereby the detectable events are detectable from first and second sides of said sample holder means, said first and second sides corresponding to opposite sides of the two dimensional surface distribution of the detectable events;
first detector means arranged on said first side of said sample holder means and having a detector input arranged in predetermined relation with respect to the sample whereby said detector input is substantially parallel with the two-dimensional surface distribution, said detector input being situated in the vicinity of a predetermined region of the two-dimensional surface distribution, for producing a first detector signal at an output thereof, said first detector signal having a detector portion responsive to the detection of the detectable events by said first detector means, and a location portion containing information responsive to the position of each of said detected detectable events in said predetermined region of the twodimensional surface distribution of the sample;
second detector means arranged on said second side of said sample holder means, for producing a second detector signal at an output thereof responsive to detection of the detectable events by said second detector means;
discriminator means for receiving said detector portion of said first detector signal responsive to said detection of said detected detectable events and providing at an output thereof a first detection logic pulse responsive to a magnitude of said detector portion of said first detector signal; and
coincidence detection means for producing a logic signal responsive to temporal coincidence of said first detection logic pulse and said second detector signal.

4,967,085
X-RAY INTENSIFYING SCREEN INCLUDING A TITANIUM ACTIVATED HAFNIUM DIOXIDE PHOSPHOR CONTAINING NEODYMIUM TO REDUCE AFTERGLOW

Philip S. Bryan, Webster; Patrick M. Lambert; Christine M. Towers, both of Rochester, and Gregory S. Jarrold, Henrietta, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 305,222, Feb. 3, 1989. This application Nov. 16, 1989, Ser. No. 437,464
Int. Cl.[5] C09K *11/67*
U.S. Cl. 250—483.1 12 Claims

1. A screen comprised of
a support and
a fluorescent layer containing a phosphor capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation comprised of monoclinic crystals of a titanium activated hafnium dioxide phosphor host,
characterized in that the monoclinic crystals consist essentially of oxygen and combined elements satisfying the relationship

$$Hf_{1-z}Zr_zTi_xM_yNd_w$$

wherein
M represents at least one alkali metal;
w is in the range of from 5×10^{-8} to 5×10^{-4};
x is in the range of from 3×10^{-4} to 1.0;
y is up to 1; and
z is up to 0.3,
the phosphor exhibiting reduced afterglow when excited by X-radiation as compared to the phosphor as defined above absent neodymium.

2. A screen comprised of
a support and
a fluorescent layer containing a phosphor capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation comprised of monoclinic crystals of a titanium activated hafnium dioxide phosphor host,

characterized in that the monoclinic crystals consist essentially of oxygen and combined elements satisfying the relationship

$$Hf_{1-x-z}Zr_zTi_xM_yNd_wL_v$$

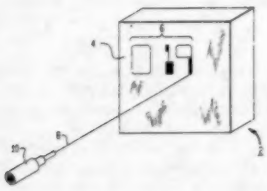
wherein
L is at least one of samarium and europium;
M represents at least one alkali metal;
v is in the range of from $1\times10-6$ to $5\times10-4$;
w is in the range of from 5×10^{-8} to 5×10^{-4};
x is in the range of from 3×10^{-4} to 1.0;
y is up to 1; and
z is up to 0.3,
when excited by X-radiation the phosphor exhibiting (a) reduced afterglow as compared to the phosphor as defined above absent neodymium, samarium and europium and (b) higher prompt emission intensity as compared to the phosphor as defined above absent samarium and europium.

4,967,086

IDENTIFICATION OF SCINTILLATION CRYSTALS

Robert W. Pollock, Evanston, and Daniel J. Godlewski, Des Plaines, both of Ill., assignors to Siemens Gammasonics, Inc., Hoffman Estates, Ill.

Filed Sep. 10, 1989, Ser. No. 905,892
Int. Cl.[5] G01T *1/202*
U.S. Cl. 250—483.1 **6 Claims**



1. A method of placing identification markings upon small scintillation crystals, comprising the following steps:
coating a surface of the crystal with a thin layer of a metal which transmits ionizing radiation; and
etching said layer with identification markings.

4,967,087

X-RAY INTENSIFYING SCREEN INCLUDING A TITANIUM ACTIVATED HAFNIUM DIOXIDE PHOSPHOR CONTAINING YTTERBIUM TO REDUCE AFTERGLOW

Philip S. Bryan, Webster; Patrick M. Lambert; Christine M. Towers, both of Rochester, and Gregory S. Jarrold, Henrietta, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 305,222, Feb. 3, 1989. This application Nov. 16, 1989, Ser. No. 437,868
Int. Cl.[5] C09K *11/67*
U.S. Cl. 250—483.1 **11 Claims**

1. A screen comprised of
a support and
a fluorescent layer containing a phosphor capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation comprised of monoclinic crystals of a titanium activated hafnium dioxide phosphor host,
characterized in that the monoclinic crystals consist essentially of oxygen and combined elements satisfying the relationship

$$Hf_{1-x-z}Zr_zTi_xM_yYb_w$$

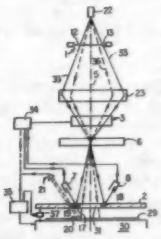
wherein
M represents at least one alkali metal;
w is in the range of from 1×10^{-6} to 1×10^{-3};
x is in the range of from 3×10^{-4} to 1.0;
y is up to 1; and
z is up to 0.3,
the phosphor exhibiting a reduced afterglow when excited by X-readiation as compared to the phosphor as defined above absent ytterbium.

4,967,088

METHOD AND APPARATUS FOR IMAGE ALIGNMENT IN ION LITHOGRAPHY

Gerhard Stengl, Wernberg; Hans Loschner; Ernst Hammell, both of Vienna, all of Austria, and Hilton F. Glavish, Salem, Mass., assignors to Oesterreichische Investitionskredit Aktiengesellschaft and IMS Ionen Mikrofabrikations Systeme Gesellschaft m.b.H., both of, Austria

Continuation-in-part of Ser. No. 50,978, May 15, 1987, Pat. No. 4,823,011. This application Jun. 2, 1988, Ser. No. 201,959
Claims priority, application Austria, Jun. 2, 1987, 1404/87
Int. Cl.[5] H01J *37/304*
U.S. Cl. 250—491.1 **49 Claims**



1. In an ion projection lithography system, an apparatus for positioning on a substrate or wafer at a target station an ion image of structures provided on a mask, said image produced by an ion beam projected along an axis upon said mask, wherein said mask includes reference marks to provide ion reference beams about the image field, the target station includes marks and the beam of the system is controlled to establish a coincidence of the marks on the mask with the corresponding marks at said target station, said ion projection system including in its optical path an electrostatic multipole, which is adapted to be controlled by a control device, means for rotational adjustment of said image relative to said substrate, and means for correcting the scale of the image, wherein at least some of the marks at said target station are carried on a reference block, said block being disposed in a predetermined position relative to the substrate and having an aperture corresponding in size to the mask image to be formed on the substrate so that the marks on said block are disposed outside the optical path used to generate the image on the substrate, said marks being on the side of said block opposite to the side on which the wafer lies and being in position to coincide with respective reference beams while said ion image is projected along the optical path toward said target station,
detectors provided for secondary radiation emitted by the marks on the reference block as a result of the ion reference beams passing through said marks on said mask, said detectors and reference block arranged along said beam path such that said reference block can shield said detectors from any secondary radiation emitted as a result of said beam striking a surface after passing through said aperture
and the signals from the detectors adapted to be delivered to the control device for the multipole, the means for relative

rotational adjustment of said image on said substrate and to the means for scale correction.

4,967,089

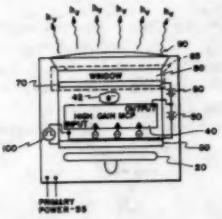
PULSED OPTICAL SOURCE

David M. Reilly, Boxborough; Anthony M. Nicoli, Brighton, both of Mass.; Richard G. Schulze, Hopkins, and Barbara L. Goldenberg, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 19, 1987, Ser. No. 122,820

Int. Cl.[5] H01J *43/00*

U.S. Cl. 250—493.1 27 Claims



1. A pulsed optical source adapted to be connected to an external power source, comprising:

photon emitting means for emitting photons;

first converting means for converting photons into photoelectrons disposed to receive photons emitted from the photon emitting means;

means for multiplying and emitting the photoelectrons in the form of a pulsed cloud of electrons, the multiplying and emitting means having input and output terminals and being disposed to receive electrons from the first converting means;

second converting means for converting electrons into photons disposed to receive the pulsed cloud of electrons from the multiplying and emitting means;

acceleration means for accelerating the pulsed cloud of electrons from the multiplying and emitting means to the electron converting means, the accelerating means comprising a voltage source having a first terminal and a second terminal wherein the first terminal is at a negative electrical potential with respect to the second terminal, and the first terminal is connected to the output terminal of the multiplying and emitting means and the second terminal is connected to the electron converting means so that the emitted pulsed cloud of electrons is accelerated to the electron converting means;

control means for controlling the duty cycle of the multiplying and emitting means having a first terminal connected to the input terminal of the multiplying and emitting means and a second terminal connected to the first converting means for converting photons into photoelectrons; and

biasing means having a first terminal and a second terminal wherein the first terminal is at a positive electrical potential with respect to the second terminal, and the first terminal is connected to the output terminal of the multiplying and emitting means and the second terminal is connected to the input terminal of the multiplying and emitting means.

4,967,090

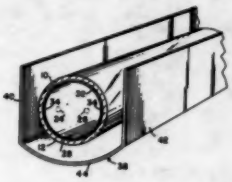
COSMETIC TANNING LAMP AND SYSTEM HAVING ADJUSTABLE UVB PROPORTION

Steven C. Schlitt, Merrimac, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 315,647, Feb. 27, 1989. This application May 7, 1990, Ser. No. 520,320

Int. Cl.[5] H01J *61/48*

U.S. Cl. 250—504 R 5 Claims



1. A suntanning fluorescent lamp comprising:

a glass envelope of substantially circular configuration in cross-section having axially opposed end portions, said envelope being capable of transmitting UVA and UVB radiation,

first and second electrodes, each of said electrodes located within a respective one of said axially opposed end portions,

an ionizable medium enclosed within said envelope including an inert starting gas and a quantity of mercury which when energized generates a plasma discharge comprising ultraviolet radiation and a limited proportion of visible radiation,

a first ultraviolet-emitting phosphor means disposed on a portion of the circumference of the interior surface of said envelope, said first ultraviolet-emitting phosphor means having a proportion of UVB to UVA radiation less than one percent; and

a second ultraviolet-emitting phosphor means disposed on the remaining portion of said circumference of said interior surface of said envelope, said second ultraviolet-emitting phosphor means having a proportion of UVB to UVA radiation within the range of from 10 percent to 12 percent, the proportion of UVB to UVA of the combined emission from said first and second ultraviolet-emitting phosphor means being controllable by the rotational alignment of said fluorescent lamp.

4,967,091

REFLECTIVE PICTURE GENERATOR

Martin L. Fair, and John C. Roberts, both of Bristol, United Kingdom, assignors to British Aerospace Public Limited Company, London, England

Filed Nov. 9, 1988, Ser. No. 269,039

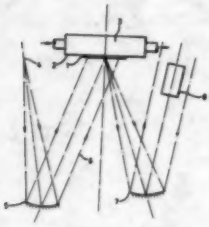
Claims priority, application United Kingdom, Nov. 9, 1987, 8726154

Int. Cl.[5] F41V *2/00*

U.S. Cl. 250—504 R 5 Claims

1. Apparatus for testing and/or calibrating a detector comprising a latent image generator, which generator comprises a specular metal plate with a scene or landscape etched upon it such that the etched and non-etched portions, having differing reflective co-efficients, give rise to respective relatively low and relatively high outputs of detection radiation when irradiated by collimated radiation; and

optical means for directing radiation from a source onto said image generator and from said image generator onto a detector to be tested, which optical means comprises two concave collimating mirrors.



4,967,092

APPARATUS FOR OPTICALLY CHECKING THE INNER PROFILE OF A TUBE OR BORE

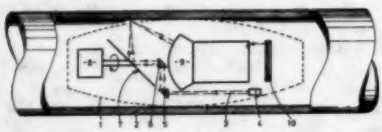
Bernard Fraignier, Villemomble, and Christian Roger, Bois Colombes, both of France, assignors to Societe Anonyme Dite Hispano-Suiza, Saint-Cloud, France

Filed May 17, 1989, Ser. No. 352,997

Claims priority, application France, May 17, 1988, 88 06588

Int. Cl.[5] G01N *21/86*

U.S. Cl. 250—560 **11 Claims**



1. Apparatus for optically checking the profile of the inner wall of a tube or bore which comprises:

a probe positioned within and movable longitudinally within said tube or bore and connectable to a power and analysis system disposed outside said tube or bore, said probe including,

alight source,

projecting means for causing light from said light source to illuminate said inner wall of said tube or bore along a line corresponding to the intersection of said inner wall with a cross-sectional plane,

a photo-sensitive sensor, and

imaging means for receiving light re-emitted from said illuminated line on said inner wall and forming an image of said line on said photo-sensitive sensor, whereby deviations of said image on said sensor from a predetermined theoretical image of said inner wall represent variations in the profile of said inner wall.

4,967,093

DEFORMATION MEASURING METHOD AND DEVICE USING CROSS-CORRELATION FUNCTION BETWEEN SPECKLE PATTERNS WITH REFERENCE DATA RENEWAL

Tamiki Takemori, Shizuoka, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Jun. 19, 1989, Ser. No. 367,659

Claims priority, application Japan, Jun. 22, 1988, 63-154298; Jul. 18, 1988, 63-178352

Int. Cl.[5] G01V *9/04*

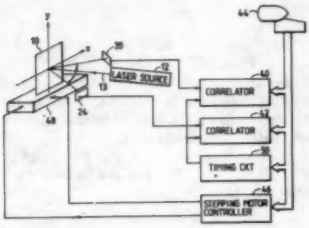
U.S. Cl. 250—560 **10 Claims**

1. A deformation measuring method for detecting the amount of deformation of an object from displacement of a speckle pattern of the object, comprising the steps of:

irradiating the object with a laser beam before and after deformation of the object to obtain speckle patterns;

converting the speckle patterns into electrical signals; and

calculating cross-correlation function between the speckle patterns from the electrical signals and obtaining the extreme value of the cross-correlation function by comparing a comparison speckle pattern data with a reference speckle pattern data for the cross-correlation function and renewing the reference speckle pattern data when the extreme value of the cross-correlation function is lower in level than a predetermined value.



4,967,094

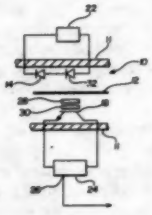
FILM DETECTION APPARATUS

Robert L. Horton, and Richard J. Backus, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 2, 1989, Ser. No. 305,832

Int. Cl.[5] G01N *21/86*

U.S. Cl. 250—561 **12 Claims**



1. Apparatus for detecting the presence of processed photographic film in a predetermined location comprising:

a light source for emitting light at a wavelength strongly absorbed by the film regardless of image density; and

means positioned to receive the light emitted by said source when the film is not present at the location, the film absorbing the light when it is present at the location to prevent light from being received by said sensing means.

4,967,095

METHOD AND APPARATUS FOR DETECTING AND SIZING PARTICLES ON SURFACES

Josef Berger, Los Altos; Armand P. Neukermans, and John L. Vaught, both of Palo Alto, all of Calif., assignors to Tencor Instruments, Mountain View, Calif.

Continuation-in-part of Ser. No. 373,026, Jun. 28, 1989, abandoned. This application Sep. 25, 1989, Ser. No. 411,910

Int. Cl.[5] G01N *21/88*

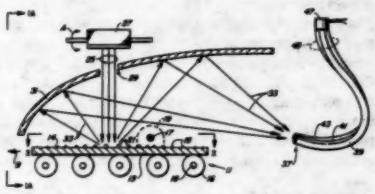
U.S. Cl. 250—572 **30 Claims**

1. A particle detection apparatus comprising,

means for supporting an object, a surface of which can be tested,

means for providing a local zone of vapor supersaturation over a portion of said surface, whereby droplets of liquid can condense around any particles on said object in said portion of said surface,

means for directing a light beam adjacent to said local zone of vapor supersaturation toward said surface,



means for providing relative movement of said object with respect to said local zone of vapor supersaturation and said adjacent light beam so as to cause relative movement of said portion of said surface having said droplets into a path of said beam, whereby light from said beam is scattered by said droplets, and

means positioned in scattered light receiving relation to said surface for detecting light scattered by said droplets, whereby particles on said object around which said droplets have condensed are detected.

4,967,096

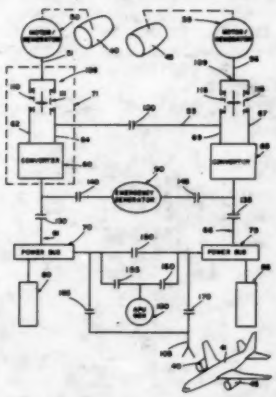
CROSS-START BUS CONFIGURATION FOR A VARIABLE SPEED CONSTANT FREQUENCY ELECTRIC POWER SYSTEM

John W. Diemer, and Michael D. Teagardin, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 26, 1989, Ser. No. 303,424

Int. Cl.[5] H02J *3/00*; F02N *11/00*

U.S. Cl. 307—19 **17 Claims**



1. In a variable speed constant frequency motor/generator power system having first and second channels, said first channel having a first converter coupled to a first power bus and said second channel having a second converter coupled to a second power bus, a cross-start subsystem, comprising:

a circuit having a variable frequency cross-start mode coupling a first motor/generator associated with said first channel to a second motor/generator associated with said second channel via said first converter to thereby allow said first motor/generator, operating as a generator, to supply variable frequency power to said first converter, said first converter supplying variable frequency power to said second motor/generator to operate said second motor/generator as a motor.

4,967,097

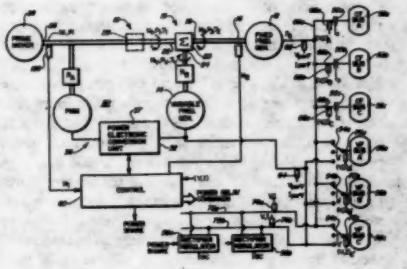
HYBRID POWER SYSTEM

Bryon R. Mehl, c/o Sundstrand Corp., 4949 Harrison Ave., Rockford, Ill. 61125-7003

Filed Mar. 8, 1989, Ser. No. 320,490

Int. Cl.[5] H02J *1/00*; H02P *9/00*

U.S. Cl. 307—84 **10 Claims**



1. A hybrid power system for providing electric power to first and second loads, comprising:

a constant speed drive having an input coupled to a prime mover which develops variable-speed motive power, an output driven at a substantially constant speed and a speed compensation link which transmits motive trim power at a magnitude determined by the speed of the prime mover;

a first generator coupled to the output of the constant speed drive; and

a second generator coupled to the speed compensation link and driven by the motive trim power wherein the first generator develops constant frequency electric power for the first load and the second generator develops electric power for the second load at a frequency which varies in accordance with the magnitude of the trim power wherein the second load is outside of the speed compensation link.

4,967,098

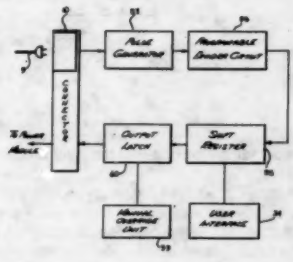
CONTROLLER FOR OUTDOOR LIGHTING SYSTEMS

David T. Carroll, Sonoma, Calif., assignor to GardenAmerica, Carson City, Nev.

Filed May 17, 1988, Ser. No. 195,080

Int. Cl.[5] H01H *43/00*; G04C *23/00*; H05B *37/02*

U.S. Cl. 307—140 **7 Claims**



1. An electronic, 24-hour, timed controller for turning lights

in an outdoor lighting system on and off, said controller comprising:

connector means for accepting a substantially 120 volt alternating current from an external source;

pulse generator means coupled to said connector means for generating a series of pulses at a substantially 60 Hertz rate, said series of pulses being a square wave pulse train, said pulse generator comprising a diode and a register coupled to an OR gate and having an output;

a programmable divider circuit coupled to said output of said pulse generator for counting a predetermined number of said pulses and outputting a first signal after a predetermined time interval;

a shift register comprised of three 8-bit serial shift registers coupled serially and coupled to said programmable divider circuit, said shift register containing 24 bits which are capable of having either a first value or a second value wherein one of said bits is a most significant bit, one of said bits is a least significant bit, and said bits are arranged in a most significant to a least significant relationship, and wherein said bits in said shift register shift from a given position to a next most significant position when said programmable divider circuit outputs said first signal;

latch means coupled to said shift register for monitoring said most significant bit and generating a second signal when said most significant bit changes from said first value to said second value, said lights turning on in response to said second signal, and for generating a third signal when said most significant bit changes from said second value to said first value, said lights turning off in response to said third signal;

program means connected to said shift register means for turning on said lights and setting at least one of said bits to said first or second value according to a user input; and

override means connected to said latch means for manually turning said lights on and off without interfering with said pulse generator, said programmable divider circuit, or said shift register.

4,967,099

LOW LEVEL CLAMP CIRCUIT

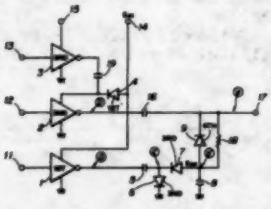
Hiroshi Mori, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 168,539, Mar. 8, 1988, abandoned, which is a continuation of Ser. No. 915,016, Oct. 3, 1986, abandoned. This application Jul. 20, 1989, Ser. No. 383,264

Claims priority, application Japan, Oct. 7, 1985, 60-223100

Int. Cl.[5] H03K *5/08, 4/00*

U.S. Cl. 307—264 **10 Claims**



1. A circuit for outputting a three-level clock pulse signal, comprising:

a first driving circuit for receiving at a first respective input a first supply voltage and at a respective second input a first clock pulse signal, and for outputting a first voltage pulse at an output with an amplitude corresponding to said first supply voltage, in response to said first clock pulse;

a first diode having first and second terminals, and receiving at said first terminal said first supply voltage, said first diode having a respective forward voltage drop when in a conducting state;

a second driving circuit having a respective first input connected to said second terminal of said first diode for receiving a second supply voltage via said first diode that is less than said first supply voltage input to said first driving circuit, as a result of said forward voltage drop of said first diode, and for outputting, in response to said first clock pulse which is also provided at a respective second input of said second driving circuit, a second voltage pulse with a respectively smaller amplitude corresponding to said smaller supply voltage;

a second diode operatively connected to said output of said first driving circuit, for clamping a high level of each said first pulse outputted from said first driving circuit and for outputting at a respective output a corresponding clamped pulse for each said first pulse, said second diode having a respective forward voltage drop when in a conducting state;

a rectifying/smoothing circuit including a third diode and a first capacitor connected in series, with the cathode of said third diode connected to the anode of said second diode, said rectifying smoothing circuit being responsive to said clamped pulses outputted from said second diode for outputting at the anode of said third diode a negative dc bias voltage, said third diode having a respective forward voltage drop when in a conducting state; and

a second capacitor and a fourth diode connected between said output of said second driving circuit and said rectifying/smoothing circuit for clamping the low level of each said second pulse outputted from said second driving circuit with said negative dc bias voltage, said fourth diode having a respective forward voltage drop when in a conducting state.

4,967,100

CAPACITIVE LOAD DRIVING APPARATUS

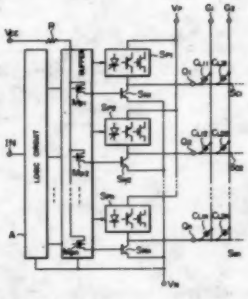
Mitsuhiko Okutsu, Katsuta; Tadaaki Kariya, Ibaraki; Kouji Kawamoto, Hitachi; Syuzoh Kaneko, Hitachi, and Yasuhiro Mashiko, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Hitachi, both of, Japan

Filed Dec. 20, 1988, Ser. No. 286,861

Claims priority, application Japan, Dec. 21, 1987, 62-321560

Int. Cl.[5] H03K *3/02, 3/26*

U.S. Cl. 307—270 **5 Claims**



1. A capacitive load driving apparatus comprising:

a first power source terminal;

a second power source terminal;

a third power source terminal;

an input terminal;

a plurality of output terminals connected to capacitive loads, respectively;

a plurality of first switching elements being coupled respec-

tively between said first power source terminal and said plurality of output terminals;

a plurality of bipolar transistors being coupled respectively between said second power source terminal and said plurality of output terminals, emitters of said plurality of bipolar transistors being commonly connected and being coupled to said second power source terminal, collectors of said plurality of bipolar transistors being respectively coupled to said output terminals;

a plurality of second switching elements, each one thereof being respectively coupled between said third power source terminal and a base of a respective one of said plurality of bipolar transistors, wherein when a respective one of said plurality of second switching elements is turned ON, there is applied therethrough a base current signal to a corresponding one of said plurality of bipolar transistors in accordance with a potential being applied at said third power source terminal;

a logic circuit, coupled to said input terminal, for forming a driving signal which turns on selectively either one or all of said second switching elements in accordance with an input signal from said input terminal, wherein the selective turning ON of either one or all of said second switching elements correspondingly results in one or all of said plurality of bipolar transistors being selectively turned on in response to said driving signal being applied to a respective one or all of said second switching elements to which said plurality of bipolar transistors are correspondingly coupled to; and

means for providing a base current to be supplied in accordance with applying a potential to said third power terminal such that when a selection is made for one of said plurality of bipolar transistors to be turned ON, base current drive signal is provided for effecting said base current of a magnitude which is greater than that for providing the respective base currents to be supplied to each one of said plurality of bipolar transistors when all of said plurality of transistors are selected to be turned ON.

4,967,101

PRE-DRIVE CIRCUIT

Shigeo Nakamura, and Osamu Yairo, both of Oshino, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

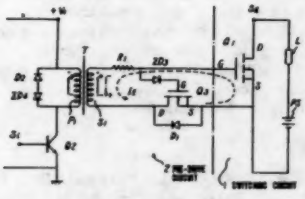
PCT No. PCT/JP88/00081, § 371 Date Jul. 11, 1988, § 102(e) Date Jul. 11, 1988, PCT Pub. No. WO88/05978, PCT Pub. Date Aug. 11, 1988

PCT Filed Jan. 29, 1988, Ser. No. 224,882

Claims priority, application Japan, Jan. 29, 1987, 62-019386

Int. Cl.[5] H03K *3/01, 17/687, 17/60*; **G05F** *1/40*

U.S. Cl. 307—270 **17 Claims**



1. A pre-drive circuit for transmitting a signal to a gate of a first MOS-type field-effect transistor controlled to render a load current intermittent, comprising:

a pulse transformer having a primary side for receiving an intermittent primary current and a secondary side, operatively connected to the gate of the first MOS-type field effect transistor, to supply an intermittent secondary current thereto;

detecting means for detecting a predetermined negative voltage when a gate voltage of the first MOS-type field-effect transistor makes a transition to a negative region from a positive direction; and

interrupting means for interrupting the intermittent secondary current from the secondary side of said pulse transformer, when said detecting means detects the predetermined negative voltage to prevent the gate voltage from being charged more negative than the predetermined negative voltage.

4,967,102

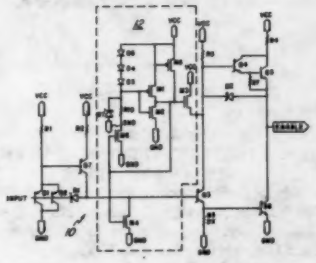
BICMOS POWER UP 3-STATE CIRCUIT HAVING NO THROUGH CURRENT IN THE DISABLED MODE

Theodor W. Mahler, Sherman, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 8, 1989, Ser. No. 363,642

Int. Cl.[5] H03K *3/01, 19/02, 17/16, 19/094*

U.S. Cl. 307—270 **6 Claims**



1. A power-up 3-state circuit controlling an output line of an enable buffer, said 3-state circuit comprising:

a CMOS inverter coupled between a source of supply voltage and ground;

a voltage divider circuit coupled to an input gate and an output of said inverter;

a first current source coupled between the gate of the inverter and ground;

a second current source coupled between the supply voltage and the output of the inverter;

a first switch receiving the output of said inverter and coupled between the supply voltage and a phase splitter of said buffer, said first switch selectively supplying a disable output signal to the output line of said buffer; and

a second switch receiving the output of said inverter and coupled between input circuitry of said buffer and ground, said second switch selectively transmitting, said output signal to the output line of said buffer.

4,967,103

INTEGRATED LOGIC CIRCUIT WITH PROTECTOR TRANSISTOR

Jan Dikken, and Roelof H. W. Salters, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jan. 10, 1989, Ser. No. 295,714

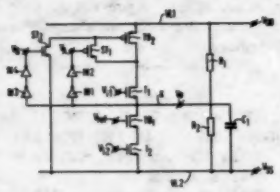
Claims priority, application Netherlands, Feb. 1, 1988, 8800236

Int. Cl.[5] H03K *17/04*

U.S. Cl. 307—296.5 **10 Claims**

1. An integrated logic circuit comprising: a first output subcircuit which is coupled in a first path between a first power supply line, which carries a high supply voltage, and an output of the circuit, and a second output sub-circuit which is coupled in a second path between the output and a second power supply line which carries a low supply voltage, a current channel comprising an at least one transistor coupled in at least one of the paths in order to limit detrimentally strong electric

fields in a further transistor of an output sub-circuit in said at least one of the paths, the at least one transistor being connected in series with the further transistor and being of a conductivity type opposite to that of the further transistor, said



series connection being coupled in said at least one of the paths, and further comprising connecting means for connecting the at least one transistor as a diode or a current source as a function of changes int he logic state of the logic circuit.

4,967,104

CIRCUIT FOR INCREASING THE OUTPUT IMPEDANCE OF AN AMPLIFIER

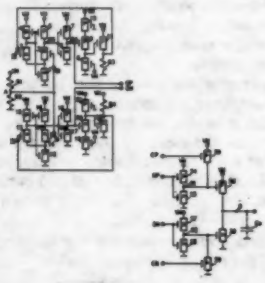
Thomas Ludwig, Sindelfingen; Helmut Schettler, Dettenhausen; Otto M. Wagner, Altdorf, and Rainer Zuhlke, Leonberg, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 2, 1989, Ser. No. 416,194

Claims priority, application European Pat. Off., Oct. 11, 1988, 88116818.1

Int. Cl.[5] H03K 17/16

U.S. Cl. 307—443 6 Claims



1. A circuit for maintaining the impedance of a power amplifier during switching between power levels on a capacitively loaded output line comprising:

a power amplifier circuit having a power stage transistor coupled to a capacitively loaded output line, and

a control circuit comprising a differential amplifier circuit having a first input coupled to a voltage source, a second input coupled to a feedback means, and an output,

said output being coupled to the power amplifier, to impedance control means for simulating said power stage transistor and to said feedback means,

said power amplifier circuit further including a prestage transistor and a power control transistor coupled to said power stage transistor, said prestage transistor being further coupled to a data input and said power control transistor being further coupled to the output of said control circuit.

4,967,105

LOAD CURRENT CONTROL-TYPE LOGIC CIRCUIT

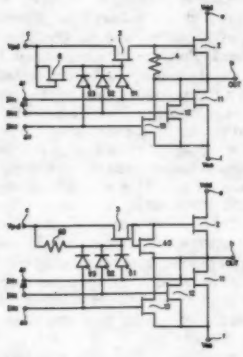
Norio Akamatsu, 9-3, 4-chome Sumiyoshi-cho, Tokushima-shi, and Toshiya Tsukao, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha and Norio Akamatsu, both of Osaka, Japan

Filed May 30, 1989, Ser. No. 358,072

Claims priority, application Japan, May 30, 1988, 63-133798

Int. Cl.[5] H03K 19/017, 19/094, 19/084, 19/20

U.S. Cl. 307—448 14 Claims



1. A load current control-type logic circuit comprising:

a plurality of input terminals to each of which a logic signal is inputted;

a plurality of switching field effect transistors respectively provided corresponding to said input terminals, each including a source to which a first low potential is applied and a gate respectively connected to said input terminals;

a load field effect transistor including a drain to which a high potential is applied and a source connected to the respective drains of said switching field effect transistors;

a load connected between the gate and the source of said load field effect transistor;

a load current control field effect transistor including a source to which a second low potential is applied and a drain connected to the gate of said load field effect transistor;

a plurality of diodes respectively provided corresponding to said input terminals, each including an anode respectively connected to said input terminals and a cathode connected to the gate of said load current control field effect transistor;

a pull-down constant current source connected to the respective cathodes of said diodes; and

an output terminal connected to the respective drains of said switching field effect transistors, whereby

an OR output of input signals of said diodes is supplied as a load current control signal to the gate of said load current control field effect transistor.

4,967,106

EMITTER-COUPLED LOGIC CIRCUIT

Yukio Tamegaya, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Aug. 4, 1989, Ser. No. 389,537

Claims priority, application Japan, Aug. 6, 1988, 63-196478

Int. Cl.[5] H03K 19/013, 19/086, 17/04

U.S. Cl. 307—455 16 Claims

1. An emitter-coupled logic circuit, comprising

(a) a first bipolar transistor of a first type having its base electrically connected to a first input signal source (V_{IN}) and its collector electrically connected to a first supply voltage source network,

(b) a second bipolar transistor of the first type having its base

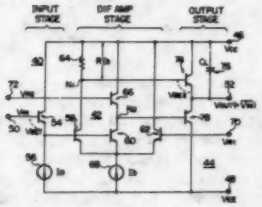
electrically connected to a second input signal source (V_{REF1}) and its collector electrically connected to said first supply voltage source,

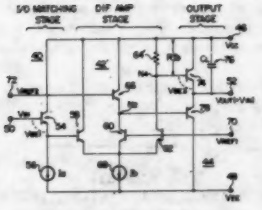
(c) a constant current source network through which said first and second bipolar transistors have their respective emitters electrically connected in parallel to a second supply voltage source,

(d) a first emitter-follower circuit having an input terminal electrically connected to the collector of said first bipolar transistor and its collector electrically connected to said first supply voltage source network, said bipolar transistor type emitter-follower circuit further having an output terminal,

(e) a load element electrically connected between said first supply voltage source and the collector of one of said first bipolar transistor and said second bipolar transistor,

(f) a third bipolar transistor of the first type having its base electrically connected to a reference voltage source and





its collector electrically connected to said first supply voltage source,

(g) a fourth bipolar transistor of the first type having its base electrically connected to the base of said first bipolar transistor, its collector electrically connected to the emitter of said third bipolar transistor and its emitter electrically connected in parallel with the the emitters of said first and second bipolar transistors to said second supply voltage source, and

(h) a second emitter-follower circuit having an input terminal electrically connected a junction between the emitter of said third bipolar transistor and the collector of said fourth bipolar transistor, said second emitter-follower circuit further having an output terminal,

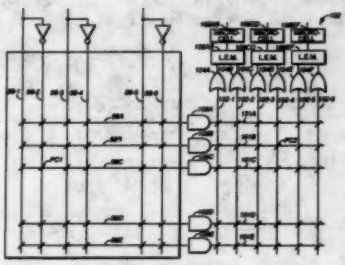
(i) the output terminal of said first emitter-follower circuit and the output terminal of said second emitter-follower circuit being electrically connected together to provide an output terminal of the emitter-coupled logic circuit.

4,967,107

PROGRAMMABLE LOGIC EXPANDER

Cecil H. Kaplinsky, Palo Alto, Calif., assignor to Plus Logic, Inc., San Jose, Calif.

Filed May 12, 1989, Ser. No. 351,840
Int. Cl.[5] H03K *19/00*
U.S. Cl. 307—465 **23 Claims**



1. A programmable logic device comprising:

a plurality of groups of logic gates in a first array of logic gates, with each logic gate having at least two input terminals and having an output terminal;

a plurality of logic gates in a second array, with each logic gate having at least one input terminal and having an output terminal;

within each group of logic gates of the first array, a connection between the output terminals of this group and input terminals of selected logic gates in the second array;

a plurality of logic device input terminals;

first programming means for selectively connecting each logic device input terminal to an input terminal of selected logic gates in the first array, for producing a first group of desired output signals at the output terminals of the selected logic gates of the second array;

logic expander means having at least first and second data input terminals to receive two input signals D1 and D2 from the output terminals of the second array of logic gates, respectively, having an integer number n of control input terminals to receive n control signals thereat, where n is an integer that is greater than zero and less than five, and having an output terminal thereat, for producing a desired output signal that is selectively determined by the n control signals to be one of the logical signals 0, 1, D1, D2, D1*, D2*, D1+D2, (D1+D2)*, D1.D2, (D1.D2)*, D1*+D2, D1+D2*, D1*.D2, D1.D2*, D1⊕D2 and (D1⊕D2)*; and

second programming means for providing n control signals at the n control input terminals.

4,967,108

DIFFERENTIAL-TIME-CONSTANT BANDPASS FILTER USING THE ANALOG PROPERTIES OF DIGITAL CIRCUITS

Robert D. Lee, Denton, and Robert W. Mounger, Dallas, both of Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Dec. 9, 1988, Ser. No. 283,554
Int. Cl.[5] H03K *19/00, 5/00*
U.S. Cl. 307—520 **15 Claims**

2. An integrated circuit bandpass filter, for providing a passband with predetermined upper and lower passband edge frequencies, comprising:

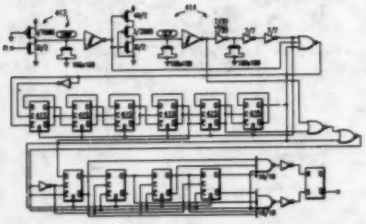
a first digital circuit which has an input and an output, said output responding with loss-pass frequency-domain response characteristics, which include a sharp cutoff at

approximately the lower passband edge frequency, to signals applied at the input thereof;

a second digital circuit which has an input and an output, said output responding with low-pass frequency-domain response characteristics, which include a sharp cutoff at approximately the upper passband edge frequency, to signals applied at the input thereof;

a third digital circuit which implements a counter function, and which comprises connections including at least

a first input having functionality analogous to a conventional counter's reset input, and



a second input having functionality analogous to a conventional counter's clock input, and

a count output which is determined in accordance with said clock and reset inputs;

wherein the output of said first digital circuit is connected to drive said first input of said third circuit, and the output of said second digital circuit is connected to drive said second input of said third circuit;

whereby said count output of said third digital circuit provides said bandpass filter function.

4,967,109

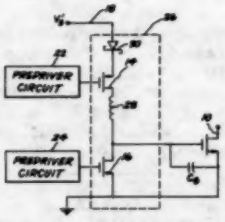
HIGH EFFICIENCY GATE DRIVER CIRCUIT FOR A HIGH FREQUENCY CONVERTER

Robert L. Steigerwald, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 8, 1989, Ser. No. 447,948

Int. Cl.[5] H03K *17/60, 19/094*

U.S. Cl. 307—571 **11 Claims**



1. An efficient gate driver circuit for driving a semiconductor power switching device of a high-frequency power converter, said power switching device having an input capacitance, comprising:

a first switch means for coupling to a gate drive power supply for turning ons aid power switching device;

a second switch means coupled in series with said first switch means for turning off said power switching device;

inductance means coupled in series with said first and second switch means, said first and second switch means thereby being coupled in a half-bridge configuration, said inductance means being of a size selected to resonate with said input capacitance and to charge said input capacitance to a predetermined lelve when said power switching device is turned on; and

blocking means coupled in series with said first switch means for preventing said input capacitance from discharging through said first switch means to said gate drive power supply.

4,967,110

MASTER-SLICE TYPE INTEGRATED CIRCUIT INCLUDING MACROCELLS ASSOCIATED WITH DELAY CIRCUIT

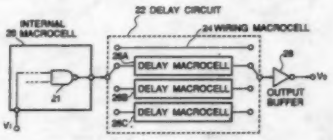
Hideki Matsuura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 27, 1989, Ser. No. 316,284

Claims priority, application Japan, Feb. 26, 1988, 63-45001

Int. Cl.[5] H03K *5/13, 17/16*

U.S. Cl. 307—592 **5 Claims**



1. A master slice type integrated circuit including a macrocell connected to an input terminal so as to receive an input signal through said input terminal and execute a predetermined processing for the received input signal, a delay circuit connected to an output of the macrocell and composed of a plurality of unitary delay circuits located in parallel to one another and having predetermined but different delay times, one of said unitary delay circuits being composed of a simple wiring which will cause no substantial delay time, one of said unitary delay circuits being selected to be connected to the output of said macrocell, an output buffer having an input connected to an output of said selected unitary delay circuit and an output connected to an output terminal, so that the output of the macrocell is outputted through said output buffer with a desired delay time between said input terminal and said output terminal, said unitary delay circuits being other than the selected unitary delay circuit and are connected to neither the output of the corresponding macrocell nor the input of the corresponding output buffer.

4,967,111

SYSTEM FOR AXIALLY LOCATING THE ROTOR OF A ROTATING MACHINE

Raymond Andrieux, Meudon; Pierre Hom, Maurepas, and Patrick Laseneur, Courbevoie, all of France, assignors to Valeo, Paris, France

Filed Jan. 12, 1989, Ser. No. 296,004

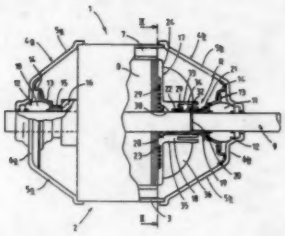
Claims priority, application France, Jan. 14, 1988, 88 00356

Int. Cl.[5] H02K *5/16*

U.S. Cl. 310—90 **6 Claims**

1. A system for axially keying a rotor of a rotating machine such as an electric motor, to a shaft which bears near one end on a first bearing mounted in a stator of the rotating machine and near its other end, on a second bearing likewise mounted in said stator, means for controlling axial clearance between said second bearing and said rotor comprising an insulating disc applied against an adjacent surface of said rotor, said disc having a sleeve which is coaxial with said rotor and projecting towards said second bearing and said means for controlling axial clearance including a spacing bush adapted to bear against said second bearing and to engage said sleeve of said insulating disc; wherein said disc of the rotor comprises at least one recess the median plane of which is substantially orthogonal to the shaft of said rotor, and a communicating channel between said recess and an annular space provided between

the internal surface of said sleeve and the external surface of the shaft of said rotor, and means for introducing a liquid, which can subsequently be hardened, into said annular space, and when said spacing bush is engaged in said sleeve and



therefore in said annular space, said bush acts as a piston to drive excess liquid back into said recess, whereby the liquid after hardening provides a bonding to key said rotor to said shaft.

4,967,112

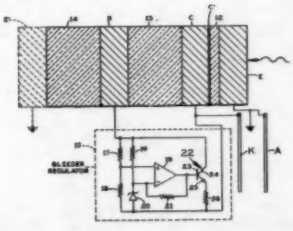
ELECTRICAL POWER CELL ENERGIZED BY HIGH FREQUENCY ELECTROMAGNETIC RADIATION

John J. Day, 911 NW. 42nd Ave., Coconut Creek, Fla. 33066

Filed Feb. 8, 1990, Ser. No. 476,783

Int. Cl.[5] G21D *7/00*

U.S. Cl. 310—304 **9 Claims**



1. In a power cell for generating electrical power from high frequency electromagnetic energy having a known direction of radiation, a multi-layer film comprising:

first and second electrically conductive layers spaced apart in succession in said direction and first and second intermediate layers sandwiched between said first and second electrically conductive layers;

said first electrically conductive layer being capable of emitting photoelectrons into said first intermediate layer generally in said direction when subjected to said electromagnetic energy;

said first intermediate layer being of insulating material and having a thickness substantially within the range from 50 Angstroms to 500 microns, said first intermediate layer being capable of producing secondary Compton electrons moving generally in said direction in response to the movement of said photoelectrons from said first electrically conductive layer through said first intermediate layer;

said second intermediate layer being of a material having a substantial Compton effect for producing secondary Compton electrons moving generally in said direction in response to the movement of said photoelectrons from said first electrically conductive layer through said second intermediate layer;

and said second electrically conductive layer being capable of receiving the charges of said photoelectrons and said secondary Compton electrons arriving at said second electrically conductive layer.

4,967,113

SURFACE-ACOUSTIC-WAVE CONVOLVER

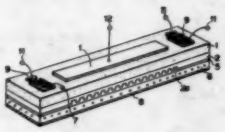
Syuichi Mitsutsuka, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 325,384

Claims priority, application Japan, Mar. 24, 1988, 63-71469; Apr. 6, 1988, 63-83167

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—313 R **42 Claims**



1. A surface-acoustic-wave convolver, comprising:

a multi-layer structure which includes a piezoelectric layer, an insulation layer and a semiconductor layer;

at least one comb-shaped electrode and a gate electrode which are both provided on said piezoelectric layer; and

an interface formed between said insulation layer and said semiconductor layer in the form of a jaggedness, said jaggedness being formed periodically in the traveling direction of a surface wave.

4,967,114

ACCELERATION DETECTOR

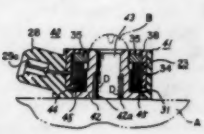
Satoshi Komurasaki, and Atsushi Ueda, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,103

Claims priority, application Japan, Apr. 13, 1988, 63-92145; Apr. 14, 1988, 63-51265; Aug. 4, 1988, 63-102749; Aug. 4, 1988, 63-102750; Aug. 10, 1988, 63-104889; Aug. 11, 1988, 63-105403

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—329 **8 Claims**



1. An acceleration detector comprising:

a housing defining a cavity therein;

an acceleration transducer assembly disposed in said cavity and including a piezoelectric element and an inertial weight;

securing means, including a thread engaging fastener thread-engaging to said housing, for securing said transducer assembly to said housing, said thread-engaging fastener having a contact surface at which said thread-engaging fastener contacts and supports said transducer assembly;

a resilient filler material applied around said acceleration transducer assembly for resiliently sealing said acceleration transducer assembly from the exterior, said resilient filler material being sufficiently resilient to allow the

movement of said inertia weight relative to said housing when an acceleration is applied to said inertial weight; and means, disposed on said housing and including an engaging surface which is engagable with an external structure, for preventing an undesirable rotation of said housing upon turning of said thread engaging fastener relative to said housing.

4,967,115

CHANNEL ELECTRON MULTIPLIER PHOTOTUBE

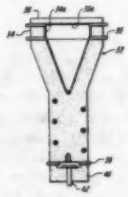
Kenneth C. Schmidt, Wilbraham, Mass., and James L. Knak, Spofford, N.H., assignors to Kand M Electronics

Continuation-in-part of Ser. No. 217,689, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 932,267, Nov. 19, 1986, Pat. No. 4,757,229. This application Mar. 3, 1989, Ser. No. 318,652

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.[5] H01J *43/04, 43/28*

U.S. Cl. 313—103 CM **16 Claims**



1. An electron multiplier phototube comprising:

A. an electron multiplier including an electrical insulating body, at least one entrance port in said body and at least one exit port in said body, at least one hollow passageway through said body between each pair of entrance and exit ports, and the walls of said hollow passageways including secondary-emissive dynode material,

B. a photocathode assembly including a transparent faceplate and a photoemission element, and including a support therefor,

C. means for sealing said photocathode assembly to said insulating body whereby said photoemission element is contiguous with the region interior to said passageways at said entrance port,

D. an anode assembly including an anode and an output signal coupler, and including a support for said anode,

E. means for sealing said anode assembly to said insulating body whereby said anode is contiguous with the region interior to said passageway at said exit port,

wherein said passageway, said photocathode assembly, and said anode assembly define a closed region including said photoemission element, said walls of said passageway, and said anode, said closed region being substantially evacuated.

4,967,116

SPARK PLUG HAVING HEAT- AND CORROSION-RESISTANT SURFACE

Takafumi Oshima, Nagoya, Japan, assignor to NGK Spark Plug Co. Ltd., Nagoya, Japan

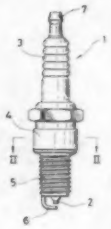
Filed Dec. 6, 1988, Ser. No. 280,314

Claims priority, application Japan, Dec. 10, 1987, 62-187218[U]

Int. Cl.[5] H01T *13/06*

U.S. Cl. 313—141 **7 Claims**

1. In a spark plug including a metal shell and a threaded portion adapted to threadedly secure the spark plug to an engine head of an internal combustion engine, the metal shell and the threaded portion each having an outer surface, the improvement comprising a heat-resistant and corrosion-resistant surface on the outer surface of the metal shell, said heat-resistant and corrosion-resistant surface comprising a layer of



nickel plating on said outside surface of the metal shell and an electrolytic chromate film formed over said layer of nickel plating.

4,967,117

ENCAPSULATED ELECTROLUMINESCENCE DEVICE

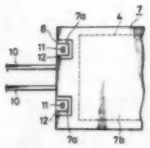
Kenji Yoshioka, and Yasuichi Ono, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,929

Claims priority, application Japan, May 23, 1988, 63-66787

Int. Cl.[5] H05B *33/04, 33/06*

U.S. Cl. 313—506 **5 Claims**



1. An electroluminescence device (ELD) comprising a light emitting layer inserted between an opposite electrode and a transparent electrode to form a multi-layered structure, said structure being airtightly sealed by a pair of protective sheets and said ELD being able to be fitted to an external apparatus by means of a metal fixture, wherein a metal composite film formed by inserting a metal foil between a pair of resin films s used for a first sheet of said pair of protective sheets over said opposite electrode, said metal composite film having a notch formed by removing part of said metal foil around a portion of said metal composite film prepared to accommodate said fixture, said notch being located near an edge of said metal composite film.

4,967,118

NEGATIVE GLOW DISCHARGE LAMP

Etsuo Urataki; Masaroshi Kodama, both of Tokyo, and Hiromitsu Matsuno, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 9, 1989, Ser. No. 321,066

Claims priority, application Japan, Mar. 11, 1988, 63-56056

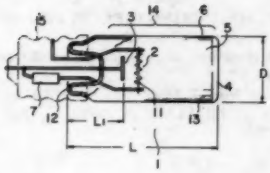
Int. Cl.[5] H01J *61/4, 61/30, 61/54;* **H05B** *41/18*

U.S. Cl. 315—56 **5 Claims**

1. A negative glow discharge lamp comprising a cylindrical discharge container enclosing at least rare gas, a hot cathode disposed in said discharge container and coated with a thermion radiation matter, and an anode disposed in a negative glow domain formed between said anode and said hot cathode in

said discharge container, wherein the outer diameter D (mm) of said discharge container is selected to satisfy the relation

$$3\,W_L < D < 10\,W_L$$



where W_L is the electric power consumption (W) of said discharge lamp when the length L (mm) of said discharge container lies within the range of L=25 to 100 mm.

4,967,119

AIR TRANSPORTING ARRANGEMENT

Vilmos Török, Lidingö, and Andrzej Loreth, Åkersberga, both of Sweden, assignors to Astra-Vent AB, Stockholm, Sweden

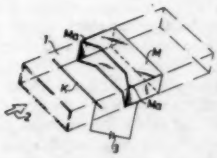
PCT No. PCT/SE86/00547, § 371 Date May 27, 1988, § 102(e) Date May 27, 1988, PCT Pub. No. WO87/04019, PCT Pub. Date Jul. 2, 1987

Continuation-in-part of Ser. No. 31,010, Jan. 13, 1987, Pat. No. 4,812,711. This PCT application Dec. 2, 1986, Ser. No. 199,259

Claims priority, application Sweden, Dec. 20, 1985, 8506068; Mar. 3, 1986, 8604219

Int. Cl.[5] **H01J** *7/24;* **H01T** *23/00*

U.S. Cl. 315—111.91 **13 Claims**



1. An arrangement for generating a flow of air along a flow path therefor with the aid of an electric ion-wind, comprising at least one thin wire-like corona electrode having first and second opposite ends attached to support means therefor and extending across said flow path in a transverse plane substantially perpendicular to the axial extension of the flow path, at least one target electrode located in said flow path downstream of and spaced from said corona electrode as seen in the axial extension of the flow path and being permeable to a flow of air along said path, and a d.c. voltage source having a first terminal connected to said corona electrode and a second terminal connected to said target electrode for creating a corona discharge at said corona electrode, said target electrode having such a shape that the distance between said transverse plane and said target electrode, as seen in the axial extension of the flow path, is shorter at the ends of said corona electrode than at the center part of the corona electrode located between said ends thereof.

4,967,120

ELECTRON GUN ASSEMBLY OF COLOR RAY TUBE

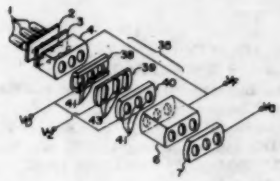
Takashi Katsuma, Tokyo; Hideo Mori; Toshio Shimaohgi, both of Fukaya, and Naoaki Umezu, Ageo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 172,544, Mar. 24, 1988, abandoned. This application Feb. 23, 1990, Ser. No. 484,004

Claims priority, application Japan, Mar. 30, 1987, 62-74401

Int. Cl.[5] **H01J** *29/38, 29/46, 29/50, 29/74*

U.S. Cl. 315—382 **7 Claims**



1. A color cathode ray tube assembly having a horizontal plane and a vertical plane normal to the horizontal plane comprising:

a phosphor screen;

quadra-potential electron gun means for generating and directing three electron, beams toward the phosphor screen, said electron gun means including:

(a) cathode means, comprised of three cathodes which are arranged in a line, for emitting the three electron beams in the horizontal plane;

(b) first electrode means, comprised of first, second and third grid electrodes separated from each other, for forming prefocus lenses to accelerate and control the electron beams emitted from said cathode means, respectively, by a constant amount;

(c) second electrode means, comprised of a fourth grid assembly which includes first, second and third electrode segments separated from each other and closely arranged, for forming asymmetrical lenses each having a lens power to converge the accelerated and controlled electron beams in the horizontal plane and diverge the accelerated and controlled electron beams in the vertical plane, respectively and for forming first symmetrical sublenses with said first electrode means for converging the electron beams, each having a lens power which is dynamically changed in accordance with the deflection amount of the electron beam on one said side of said asymmetrical lenses closer to said cathode means; and

(d) third electrode means, comprised of fifth sixth grid electrodes separated from each other, for forming symmetrical main lenses to focus the electron beams passing through said second electrode means onto the phosphor screen by a constant focusing amount, respectively and for forming second symmetrical sublenses with said second electrode means on another side of said asymmetrical lenses farther from said cathode means for converging the electron beam, each having a lens power which is dynamically changed in accordance with the deflection of the electron beam;

first connecting means for connecting the third grid electrode to the fifth grid electrode;

second connecting means for connecting the first segment to the third segment;

first voltage applying means for applying a high voltage through said first connecting means to the third and fifth grid electrodes to maintain the third and fifth grid electrodes at a same potential level;

second voltage applying means for applying a D.C. constant potential to the second electrode segment; and

third voltage applying means for applying a dynamic voltage through said second electrode segment to the first and

third electrode segments, having a dynamic level which is lower than the high potential level applied to said third and fifth grid electrodes when a deflection amount of the electron beams is other than zero, and is varied in accordance with the deflection amount of the electron beams, wherein the first and second symmetrical sublenses dynamically focus the electron beams onto the phosphor screen, and the lens power of the asymmetrical electron lenses formed in said second electrode means is dynamically changed in accordance with the deflection of the electron beams so that each of the electron beams is vertically elongated to have an elliptical shape.

4,967,121

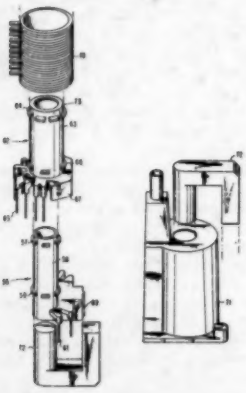
ISOLATING HIGH VOLTAGE TRANSFORMER FOR VIDEO APPARATUS

Leroy W. Nero, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 54,906, May 27, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 229,776

Int. Cl.[5] H01J *29/70*; G09G *1/04*; H01F *27/24*

U.S. Cl. 315—411 **8 Claims**



1. A power supply apparatus of a video apparatus, comprising:

a source of a mains supply voltage;

switching means responsive to an input signal at a given frequency and coupled to said source for generating a first voltage that is conductively coupled in an electrically nonisolated manner to said mains supply voltage at a frequency that is related to that of said input signal; and

a high voltage transformer, including:

a magnetically permeable core;

a first bobbin encircling said core and having a first winding wound on said bobbin, said first winding being conductively coupled in an electrically nonisolated manner to said first voltage for energizing said transformer;

a second bobbin encircling said first winding and having a second winding wound on said second bobbin for transformer coupling said first voltage via said first winding to said second winding to develop a second voltage in said second winding that is conductively isolated from said mains supply voltage and that is coupled to a first load circuit of said video apparatus, said second bobbin providing an isolation barrier between said first and second windings; and

a third bobbin encircling said second winding and having a high voltage winding wound on said third bobbin for transformer coupling said first voltage to said high voltage winding to develop a high amplitude high voltage in said high voltage winding that is coupled to a high voltage electrode of a cathode ray tube of said video apparatus and that is conductively isolated from said mains supply voltage, such that said second and third bobbins provide an isolation barrier between said high voltage and first windings.

4,967,122

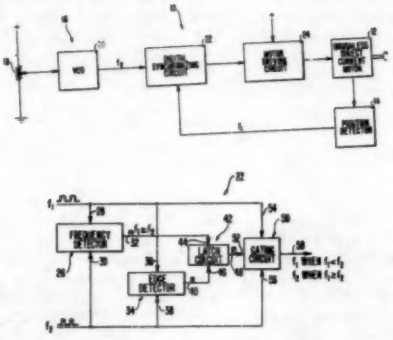
DIGITAL SYNCHRONIZING CIRCUIT FOR BRUSHLESS DC MOTOR

Fenton L. Rees, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 7, 1989, Ser. No. 319,727

Int. Cl.[5] H02K *29/02*

U.S. Cl. 318—254 **20 Claims**



1. A brushless DC motor comprising:

a pulse source, coupled to the brushless DC motor, for producing pulses f_1 which are proportional to rotational velocity and position of a rotor of the motor for controlling acceleration of the motor up to a first rotational velocity;

a variable frequency pulse source of pulses f_2 for controlling the rotational velocity of the rotor for rotational velocities from the first rotational velocity to a second higher rotational velocity;

a gating circuit, coupled to the pulse source for producing pulses f_1, to the pulse source of pulses f_2 and to a source of a control signal, for producing an output for the pulses f_1, when the control signal has a first state and for producing an output of the pulses f_2 when the control signal has a second state;

a motor drive, having an input coupled to the output of the gating circuit, for supplying power to motor windings of the motor;

a detector, responsive to the pulses f_1 and f_2, for detecting when the pulses f_1 have a frequency equal to or greater than a frequency of the pulses f_2 and producing an output signal when the pulses f_1 have a frequency equal to or greater than the frequency of the pulses f_2;

a coincidence detector, coupled to the pulse source for producing the pulses f_1 and to the source of the pulses f_2, having an output on which is produced an output signal when the pulses f_1, and f_2 are at least partially overlapping; and

a bi-stable circuit, having an input coupled to the output of the detector for detecting when the pulses f_1 have a frequency equal to or greater than a frequency of the pulses f_2 and an input coupled to the coincidence detector, for producing the control signal of the second state when the

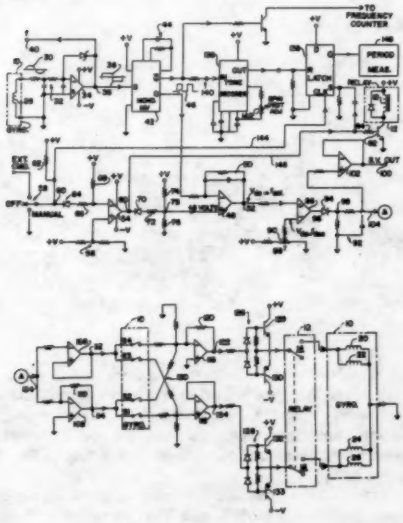
pulses f_1 and f_2 are at least partially overlapping and the output of the detector for detecting is present and the control signal of the first state at least when the pulses are not at least partially overlapping.

4,967,123

GYRO CONTROL AND MONITOR CIRCUIT

Robert A. Lebsock, Las Cruces, N. Mex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 30, 1990, Ser. No. 471,978
Int. Cl.[5] H02K *11/00*
U.S. Cl. 318—490 **19 Claims**



1. A method for electrically testing an electric motor for mechanical integrity while being energized, comprising:

generating a signal having a parameter which is a function of actual motor speed;

generating a signal having a parameter which is a function of desired motor speed;

comparing both said signals and generating therefrom a sustain voltage for driving said motor at a predetermined speed;

applying said sustain voltage to said motor; and

monitoring said sustain voltage to determine mechanical integrity of said motor whereby a relatively low magnitude thereof is indicative of a high quality motor, whereas a large voltage is indicative of a poor quality motor.

4,967,124

SERVO CONTROL APPARATUS

Masanori Hirai, Gifu, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed Jul. 5, 1989, Ser. No. 375,680
Claims priority, application Japan, Jul. 12, 1988, 63-171873
Int. Cl.[5] H02P *1/04*; B64C *13/38*
U.S. Cl. 318—564 **2 Claims**

1. A servo control apparatus comprising:

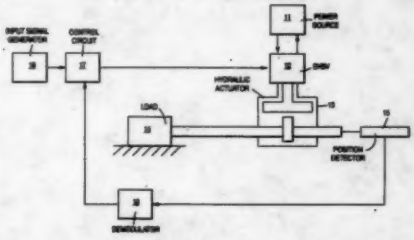
means for generating a command signal;

adding means for outputting a deviation signal, the command signal being inputted to said adding means;

means for integrating said deviation signal;

means for producing an electric current signal in response to the integrated deviation signal, the current signal changing in response to an external force exerted on an actuator of a servo system;

means for detecting a piston position of said actuator that is displaced in accordance with said current signal and for outputting a position signal;



means for amplifying said current signal with a variable gain and feeding the amplified current signal back to said adding means; and

means for feeding said position signal back to said adding means;

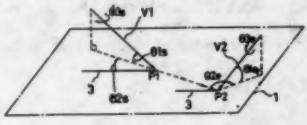
said deviation signal of said adding means being obtained by the sum of said command signal, said current signal and said position signal.

4,967,125

TOOL POSTURE CONTROL METHOD POR A ROBOT

Ryuichi Hara, Yamanashi, Japan, assignor to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP89/00262, § 371 Date Oct. 25, 1989, § 102(e) Date Oct. 25, 1989, PCT Pub. No. WO89/08878, PCT Pub. Date Sep. 21, 1989
PCT Filed Mar. 9, 1989, Ser. No. 432,747
Claims priority, application Japan, Mar. 10, 1988, 63-54835
Int. Cl.[5] G05B *19/415*
U.S. Cl. 318—568.11 **7 Claims**



1. A tool posture control method for a robot comprising steps of:

(a) instructing beforehand the robot for tool positions at a starting point and an ending point of operation and postures of said tool at said starting point and said ending point;

(b) calculating, in accordance with the result of the instruction, a first angle formed between said tool and a datum plane; at said starting point, a second angle formed between said tool projected on said datum plane and a datum line set on said datum plane, at said starting point, and a rotational position of said tool at said starting point around a tool axis;

(c) calculating said first angle, said second angle, and said rotational position around the tool axis, at said ending point, in accordance with said instruction result;

(d) interpolating said tool position, said first angle, said

second angle, and said rotational position around the tool axis, between said starting point and said ending point; and

(e) controlling the posture of said tool in accordanced with the result of the interpolation.

4,967,126

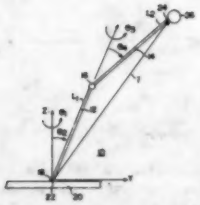
METHOD OF CONTROLLING A SEVEN DEGREE OF FREEDOM MANIPULATOR ARM

Bruce D. Gretz, Philadelphia, Pa., and Scott W. Tilley, Belmont, Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Jan. 30, 1990, Ser. No. 472,528

Int. Cl.[5] B25J *9/06;* G06F *15/46*

U.S. Cl. 318—568.19 **26 Claims**



1. An improved method for controlling the movement of a robotic arm from an initial position to a final position, comprising:

constructing a robotic arm having a first link and a second link, each said link having a first end and a second end; said first link being joined to a fixed surface at said first end thereof by a shoulder joint having two rotational degrees of freedom, and said second link being joined at said first end thereof to said second end of said first link by an elbow joint having two rotational degrees of freedom;

identifying three spatial displacement coordinates of said initial position of said second end of said second link;

identifying three spatial coordinates of said final position for said second end of said second link;

identifying initial values of said two rotational degrees of freedom of said shoulder joint;

identifying initial values of said two rotational degrees of freedom of said elbow joint;

identifying a redundant rotational degree of freedom in said arm;

utilizing a constraint that said redundant degree of freedom is equal to a fixed value;

determining final values of three remaining rotational degrees of freedom;

utilizing an equation

$$\tau_c = -[SK_pS^T \; SK_vS^T]\begin{Bmatrix} \theta \\ \dot{\theta} \end{Bmatrix}$$

wherein:

τ_c=joint control torque

K_p=a diagonal matrix containing position gain information

K_v=a diagonal matrix containing rate gain information

S=a coordinate transformation matrix

S^T=a transform of matrix S such that $S^TS=I$

θ=a vector of joint angles

$\dot{\theta}$=rate of change of θ

to determine the joint control torque of each rotational degree of freedom; and

solving said equation to determine the joint control torque for each rotational degree of freedom, and providing signals to control said shoulder joint and said elbow joint such that said second end of said second link is directed from said initial position to said final position.

4,967,127

ROBOT WITH CONTROLLED TOOL TRACKING DISPLACEMENT

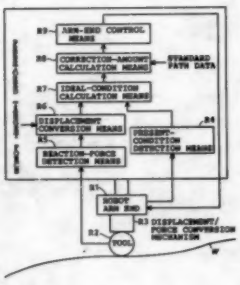
Yasuo Ishiguro, Toyota; Yoshito Kato; Chisao Hayashi, both of Aichi; Masaru Nakano, Nagoya; Mitsuo Koide, Owariasahi; Hiroshi Morihe, and Toshitaka Kuno, both of Nagoya, all of Japan, assignors to Toyota Jidoshu Kabushiki Kaisha, Toyota, Japan

Filed Jun. 23, 1989, Ser. No. 370,699

Claims priority, application Japan, Jun. 30, 1988, 63-162933

Int. Cl.[5] G05B *19/42*

U.S. Cl. 318—571 **14 Claims**



1. A tracking control robot which moves an arm holding a tool at arm end along a standard path in a coordinate system to act on a workpiece with a preset target force, comprising:

position-data storing means for obtaining and storing reference position and attitude data corresponding to the standard path;

standard-path data generating means for generating standard path position and attitude data from the reference position and attitude data;

present-condition detection means for detecting a present position and attitude of the arm end at a detecting point;

reaction-force detection means for detecting a reaction force transmitted from the workpiece to the tool at the detecting point;

displacement conversion means for calculating the difference between the detected reaction force and the present target force at the detecting point for the present position and attitude of the arm end, and for converting the difference into the displacement position of the tool;

ideal-condition calculation means for calculating an ideal position and attitude of the arm end based on the displacement position of the tool and on the present position and attitude of the arm end;

correction-amount calculation means for calculating a correction amount for the position and attitude of the arm end in accordance with a comparison between the ideal position and attitude of the arm end, and the standard path position and attitude data;

modified-standard-path data calculation means for calculating modified standard path position and attitude data from the standard path position and attitude data and the correction amount; and

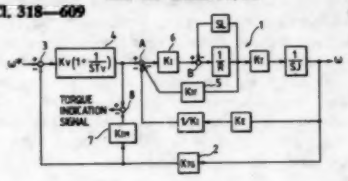
arm-end control means for controlling the position and attitude of the arm end in real time according to the modified standard path position and attitude data.

4,967,128

SERVO MOTOR CONTROL DEVICE

Kenji Sawai, Kyoto, and Jinichi Itoh, Nagano, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto and Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, both of, Japan

Filed Nov. 1, 1989, Ser. No. 430,031
Claims priority, application Japan, Nov. 4, 1988, 63-279099
Int. Cl.[5] G05B *11/36*
U.S. Cl. 318—609 4 Claims



1. In a servo motor control device for an electric motor of the type having

a speed detector for detecting the speed of rotation of said electric motor;

a proportional integral (PI) compensator for receiving a difference between a speed instruction signal and said detected speed in order to output a current instruction signal;

a current detector for detecting current flowing in said motor; and

a current amplifier for receiving an input comprising said current instruction signal minus an output of said current detector minus a counter electromotive voltage, to apply current to a coil of said motor, the improvement comprising:

a torque corrector for converting said output of said speed detector into a torque correction signal; and

a subtractor for outputting a difference between said current instruction signal and said torque correction signal,

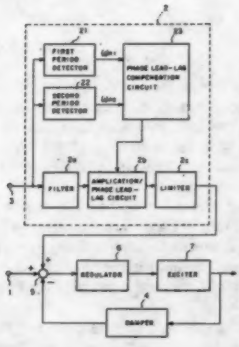
an output of said subtractor being employed as a torque indication signal.

4,967,129

POWER SYSTEM STABILIZER

Seiichi Tanaka, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 26, 1988, Ser. No. 224,458
Claims priority, application Japan, Sep. 19, 1987, 62-235615
Int. Cl.[5] G05B *6/02*
U.S. Cl. 318—621 4 Claims



1. A power system stabilizer comprising:

a plurality of period detectors connected to a dynamoelectric machine to sense at least one variable parameter therein for detecting the periods of a plurality of power swing modes in said dynamoelectric machine;

a phase lead-lag compensation circuit including a plurality of period variation detectors connected to said period dectectors for detecting variations in the periods of said power swing modes and further including fuzzy inference means connected to receive the outputs of said period variation detectors for producing a phase lead-lag compensating signal as a function of the signals received from said period variation detectors in accordance with a predetermined relationship based on fuzzy inference [logic]; and

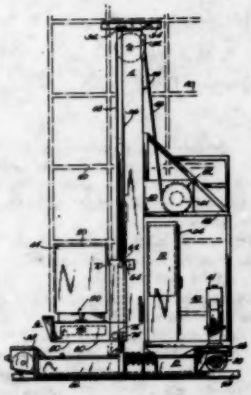
an amplification and phase lead-lag circuit connected to said phase lead-lag compensation circuit and being further connected to control means for controlling said at least one variable parameter for compensating the phase of said power system stabilizer in accordance with said phase lead-lag compensating signal.

4,967,130

METHOD AND APPARATUS FOR CONTROLLING A STORAGE AND RETRIEVAL MACHINE

B. Chuck Sorensen, Salt Lake City, Utah, and Craig A. Devroy, Wauwatosa, Wis., assignors to Harnischfeger Engineers Inc., Brookfield, Wis.

Filed Oct. 19, 1989, Ser. No. 423,908
Int. Cl.[5] H02P *5/06*
U.S. Cl. 318—652 17 Claims



1. A method for control of a storage and retrieval machine having a base travelable to designated locations along a horizontal path, a mast mounted on the base, a carriage movable in vertical directions on the mast to and from positions adjacent designated overhead storage spaces, a shuttle mounted on the carriage and extendible into and retractable from the storage spaces along a generally horizontal path transverse to the base path, base, carriage and shuttle controls respectively con-

nected to base, carriage and shuttle drives, and a supervisory control means connected between the base, carriage and shuttle controls and a remote control source, comprising the steps of:

transmitting control command information for the control of the base, carriage and shuttle from the remote control source to the supervisory control means on the storage and retrieval machine;

transmitting base, carriage and shuttle operating information from the base, carriage and shuttle controls on the storage and retrieval machine to the supervisory control means;

transmitting storage and retrieval machine condition information from sensing means on the storage and retrieval machine to the supervisory control means;

producing operating instructions at the supervisory control means to the base, carriage and shuttle controls in according with the command information received from the remote control source, the condition information received from the sensing means and the operating information received from the base, carriage and shuttle controls; and

at the base, carriage and shuttle controls, in response to the operating instructions of the supervisory control means, producing control instructions to the base, carriage and shuttle drives to respectively operate the base to said locations, the carriage to said positions, and extend and retract the shuttle.

4,967,131

ELECTRONIC MOTOR STARTER

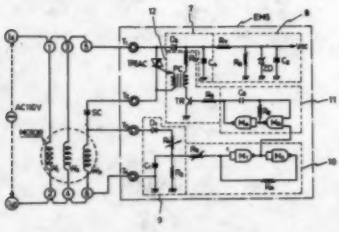
In S. Kim, Rm. 101, Bldg. No. 67 Banpo APT, Banpo-Dong, Seocho-Ku, Seoul, Rep. of Korea

Filed Aug. 15, 1989, Ser. No. 394,202

Claims priority, application Rep. of Korea, Aug. 16, 1988, 1988-10376

Int. Cl.[5] H02P *1/64*

U.S. Cl. 318—786 **8 Claims**



1. An electronic motor starter for use with a single-phase induction motor having a starting winding comprising:

a triac having a first terminal connected to a motor power source, a second terminal connected to the starting winding, and a gate terminal;

a rectifying means (7) including a first diode (D2) connected to the first terminal of the triac and a first capacitor (C4) for rectifying the power source;

a gate powering means (8) having first and second distribution resistors (R7) and (R8) connected to the rectifying means, a Zener diode (ZD) and a first filter capacitor (C2) each connected in parallel to the second distribution resistor (R8) to supply a gate powering voltage;

a signal voltage detecting means (9) across the starting winding having a second diode (D1), third and fourth distribution resistors (R1 and R2), and a second filter capacitor (C1);

a hysteresis adjusting means (10) including a hysteresis adjusting resistor (R3) connected to the junction of the third distribution hysteresis adjusting resistors (R1 and R3), first and second NAND gates M1 and M2 and a feedback resistor (R4);

an oscillating means (11) connected between the first and second NAND gates (M1 and M2) including third and fourth NAND gates (M3 and M4), a first resistor (R5), and a second capacitor (C3); and

a trigger means (12) comprised of a second resistor (R6) connected to the output of a fourth NAND gate (M4), a transistor (TR) having a base terminal connected to the second resistor (R6), an emitter terminal connected to ground and a collecter terminal, and a pick-up coil (PC) connected among the emitter terminal of the transistor (TR), the rectifying means (7) and the gate terminal of the triac, whereby the pickup coil (PC) initially activates the triac to electrically connect the starting winding until an induced voltage across the winding reaches a predetermined value and thereafter deactivates the triac to disconnect the starting winding from the motor circuitry allowing a normal operation of the motor.

4,967,132

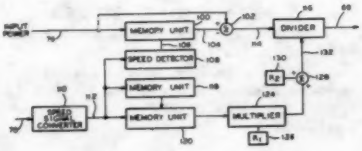
VSCF START SYSTEM CURRENT ESTIMATOR

Gregory I. Rozman, and Vijay K. Maddali, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 5, 1988, Ser. No. 279,972

Int. Cl.[5] H02P *5/40*

U.S. Cl. 318—798 **10 Claims**



1. A current estimator for a motor having a rotor and a stator having a stator coil which is energized by a converter which receives input power from a source of power for imparting rotation to the rotor, comprising:

first sensing means for sensing the speed of rotational movement of the rotor;

second sensing means for sensing the power drawn by the stator coil, including a power sensor for sensing converter input power, means for determining power losses in the converter and means for subtracting power losses from input power to determine power drawn by the stator coil; and

feedback means coupled to said first and second sensing means for developing a feedback signal representing an estimation of actual current through the stator coil responsive to said rotor speed and said power drawn by the stator coil.

4,967,133

MOTOR CONTROL APPARATUS

Hiroshi Hasegawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

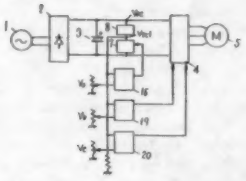
PCT No. PCT/JP87/01019, § 371 Date Oct. 25, 1988, § 102(e) Date Oct. 25, 1988, PCT Pub. No. WO88/05225, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 23, 1987, Ser. No. 254,653

Claims priority, application Japan, Dec. 26, 1986, 61-312126

Int. Cl.[5] H02P *5/40*

U.S. Cl. 318—798 2 Claims



1. A motor control apparatus comprising:

a rectifier diode connected to an alternating current power source,

a smoothing capacitor for smoothing an output of said rectifier diode,

a driving circuit for driving a motor by taking a terminal voltage of said smoothing capacitor as an input,

a regeneration voltage discharge circuit composed of a series circuit of a resistor connected to the input of said driving circuit and a switching element,

a thermal fuse connected in series to said discharge circuit for detecting the temperature of the discharge circuit,

a regeneration voltage detection circuit for detecting an input voltage of said driving circuit via said thermal fuse, and when a voltage over a predetermined value is detected, turning ON said switching element to discharge electric charge on said smoothing capacitor to said discharge circuit,

over-voltage detection circuit which stops the operation of said driving circuit when an input voltage of said driving circuit reaches a predetermined voltage which is higher than a detected voltage in which the regeneration voltage detection circuit is activated, and

a voltage-drop detection circuit which stops the operation of said driving circuit when said thermal fuse is open,

a motor control apparatus wherein the regeneration voltage detection circuit, the over-voltage detection circuit and the voltage-drop detection circuit are composed of respective comparators, and one terminal of the input terminals of respective comparators is coupled to an input terminal of the driving circuit via said thermal fuse, and respective predetermined reference voltage sources are coupled to the other terminal of said input terminals of said comparators.

4,967,134

SYNTHESIS OF LOAD-INDEPENDENT AC DRIVE SYSTEMS

Novica A. Losic, 7802-23 Ave., Kenosha, Wis. 53140, and Ljubomir D. Varga, Deskaseva 6, 11000 Belgrade, Yugoslavia

Filed Feb. 27, 1989, Ser. No. 316,664

Int. Cl.[5] H02D *5/00*

U.S. Cl. 318—802 6 Claims

1. A method for synthesizing load independent alternating current drive system comprising:

accepting a source of electrical energy of a constant voltage at an input,

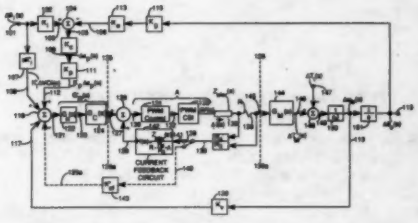
coupling mechanically an alternating current synchronous motor shaft to a load to be drive at an output,

controlling a power flow from said input to said output, modulating a power converter for the control of said power flow in a pulse width modulation control manner, supplying a total control signal for modulating said power converter,

supplying position feedback pulses,

feeding back side position feedback pulses in a negative feedback loop with respect to a position command pulses and comparing frequency and phase of the two pulse trains in a phase frequency detector; thereby producing a position error voltage signal proportional to a difference in frequency and phase between the two pulse trains, supplying a velocity feedback signal,

feeding back said velocity feedback signal in a negative feedback loop with respect to a velocity command voltage and the position error signal and summing the three voltages, passing a signal obtained as the algebraic sum of the velocity feedback signal and the velocity command



signal and the position error signal through a cascas connection of a filtering and stabilizing network and a control circuit; thereby producing a control signal proportional to the algebraic sum of the velocity command signal and the velocity feedback signal and the position error signal,

sensing a current through an alternating current synchronous motor stator,

feeding back the sensed current signal through a current feedback circuit in a positive feedback loop with respect to said control signal and summing the two signals,

supplying said total control signal, obtained as the sum of said control signal and the current signal fed through said current feedback circuit, for modulating said power converter for the control of the flow of power from the input electrical source to the output mechanical load, whereby the alternating current synchronous motor shaft position and velocity is made independent of said load.

4,967,135

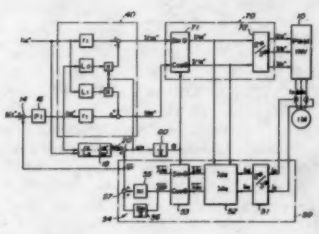
INDUCTION MOTOR VECTOR CONTROL

Tadashi Ashikaga, Tokyo, and Masakatsu Nomura, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 314,042

Int. Cl.[5] H02P *5/40*

U.S. Cl. 318—808 12 Claims



1. A method for vector control of an adjustable-speed induc-

tion motor having a secondary resistance, a secondary inductance, and a secondary time constant generally equal to the secondary resistance divided by the secondary inductance, and including means for applying a primary current and voltage to drive the induction motor, comprising the steps of:

setting a desired motor torque;

setting a desired motor flux;

calculating a slip frequency based on the desired motor torque, the desired motor flux, and the secondary time constant;

sensing the primary current and voltage;

estimating a value for induction motor angular velocity as a function of the sensed primary current and voltage;

summing the calculated slip frequency to the estimated angular velocity to calculate an angular frequency; and

controlling the motor driving means based on the desired motor torque, the desired motor flux, and the calculated angular frequency to vary the primary current and voltage so as to drive the induction motor with no β-axis secondary flux.

4,967,136

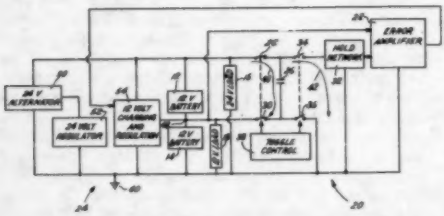
BATTERY EQUALIZATION CIRCUIT FOR A DUAL VOLTAGE CHARGING SYSTEM

Scott L. Nofzinger, Toledo, Ohio, assignor to Prestolite Electric Incorporated, Toledo, Ohio

Filed Sep. 25, 1989, Ser. No. 412,199

Int. Cl.[5] H02J 7/14

U.S. Cl. 320—6 **15 Claims**



1. In a system having first and second batteries connected in series across a first load, a second load being connected across said second battery, a battery equalization system for maintaining a balance between the voltages provided by said first and second batteries comprising:

means coupled to said first battery for storing charge;

first switching means having an open position and a closed position for charging said storage means to a first value representative of said voltage provided by said first battery when said first switch means is in said closed position;

means coupled to said storage means and to said second battery for comparing said first value to a second value representative of the voltage across said second battery to provide an error signal; and

means responsive to said error signal for minimizing the difference between the voltages provided by said first battery and said second battery.

4,967,137

HIGH VOLTAGE ELECTRICAL POWER SUPPLY DEVICE FOR THE AUXILIARY CIRCUIT OF A MOTOR VEHICLE

Didier Canitrot, La Queue en Brie; Christian Ducrot, Creteil, and Jean-Francois Terasse, Athis Mons, all of France, assignors to Equipments Electroques Moteur, Creteil, France

Filed Apr. 18, 1989, Ser. No. 340,030

Claims priority, application France, Apr. 19, 1988, 88 05163

Int. Cl.[5] B60L 1/02; H02P 9/00; H02J 7/14

U.S. Cl. 322—7 **8 Claims**

1. A device for supplying a voltage higher than a nominal supply voltage to an auxiliary electrical circuit of a motor vehicle, said device comprising:

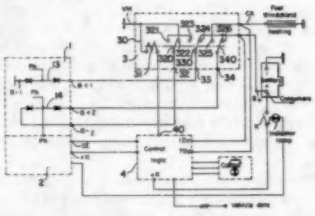
an alternator having two identical stator windings, a plurality of alternator output terminals and an inductor winding for producing an alternator output voltage;

rectifier bridge circuit means coupled to said stator windings for rectifying an alternator output voltage developed across said stator windings to supply a rectified alternator voltage on a corresponding alternator output terminal;

means for regulating an excitation current supplied to said inductor winding of said alternator;

means coupled to said alternator output terminals for switching said alternator output terminals between a parallel-series and series-parallel connection arrangement to generate a nominal value supply voltage when said connection of said alternator output terminals are switched in parallel and to generate a voltage higher than the nominal value supply voltage when said connection of said alternator output terminals are switched in series;

control circuit logic means electrically coupled to an input of said excitation regulating means and said switching means for causing said device to produce a voltage higher than the nominal value supply voltage by starting said switching means in said series connection arrangement, said switching means further including an output terminal for carrying the nominal value supply voltage when said switching means is in said parallel connection arrangement and for carrying the higher than nominal value supply voltage when said switching means is in said series connection arrangement;



said auxiliary electrical circuit further comprising a fast-heating resistive element of the type generally used to de-ice a windshield of an automobile;

said control circuit logic means having at least one input for receiving a voltage signal corresponding to and representative of the operational conditions of the automobile or environmental conditions for producing on an associated output terminal an output signal to switch said switching means to one of said series-parallel and parallel-series connection arrangement in response to a voltage signal being present at said control circuit input;

said switching means further comprising a power switching relay having an energizing coil and two operative states, said first operative state corresponding to said energizing coil not being excited and said switching means providing said parallel connection arrangement and said second operative state corresponding to said energizing coil being excited and said switching means providing said series connection arrangement, said energizing coil having terminals and being electrically coupled between a reference electrical ground voltage potential and said associated output terminal of said control circuit logic means,

said power switching relay further including:

first, second and third input terminals;

first, second and third contact blades each having a fixed end coupled to a respective first, second and third input terminal and each blade having a transfer end, and

first through sixth switching terminal, said transfer end of said first contact blade being movable between and making contact with said first and second switching terminals,

said transfer end of said second contact blade being movable between and making contact with said third and fourth switching terminals, said transfer end of said third contact blade being movable between and making contact with said fifth and sixth switching terminals;

said first, second and third output terminals being coupled to respective of said alternator output terminals, said first input terminal being connected to a first alternator output terminal carrying a negative rectified alternator output voltage potential produced by one of said stator windings, said second input terminal being connected to a second alternator output terminal carrying a positive rectified alternator output voltage potential produced by the other of said stator windings, said third input terminal being connected to a third alternator output potential produced by said one stator winding, a fourth alternator output terminal carrying a negative rectified alternator output voltage potential produced by said other of said stator windings being connected to said reference electrical ground voltage potential;

said first and third switching terminals being connected to one another, said fourth and sixth switching terminals being connected to one another and to a positive terminal B+ of the vehicle, said second switching terminal being connected to said reference electrical ground voltage potential and said fifth switching terminal being connected to an auxiliary circuit power supply terminal which supply terminal is in turn connected to the auxiliary electrical circuit, whereby said switching means provides said parallel connection arrangement for said stator windings to supply the nominal supply voltage to the positive terminal B+ of the vehicle when said power switching relay is in its first operative state and provides said series connection arrangement for said stator windings to supply a voltage higher than the nominal voltage to the auxiliary circuit coupled to the fifth switching terminal when said power switching relay is in its second operative state.

4,967,138

SWITCHED-MODE REGULATOR WITH INDUCTOR CURRENT SIMULATION CIRCUIT

Rainer Obergfell, Laugna/Bocksberg; Hubert Panse, and Wolfgang Schlegel, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

PCT No. PCT/DE88/00/56, § 371 Date Oct. 20, 1989, § 102(e) Date Oct. 20, 1989, PCT Pub. No. WO88/08638, PCT Pub. Date Nov. 3, 1988

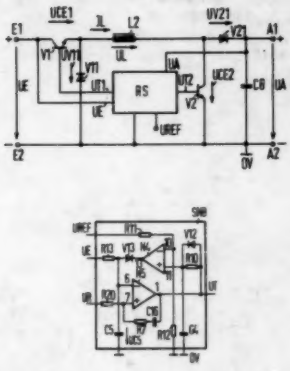
PCT Filed Mar. 15, 1988, Ser. No. 442,362

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713540

Int. Cl.[5] H02M 3/158

U.S. Cl. 323—224 **5 Claims**

1. Circuit arrangement for the conversion of an unregulated DC input voltage (UE) into a constant DC output voltage (UA), which has a common reference point (OV) with respect to its polarity, and with which the DC input voltage (UE) can assume both a higher and a lower value than the desired output voltage (UA), with an inductance (L2), serving as energy store for the conversion of the DC input voltage (UE) by alternating charging and discharging, and two switches (V1, V2), effecting the charging operation, a regulating circuit (RS), controlling the charging and discharging operation by periodic sensing, with a set/actual value comparator (SIV) for the setting of a pulse duty factor yielding the output voltage (UA), characterized in that a simulation circuit (SNB) is provided, which simulates a current (IL) through the inductance (L2) during the charging of the inductance (L2) as capacitor voltage (UC5) of a capacitor (C5), the capacitor (C5) being connected via a resistor (R13) to the input voltage (UE) and, as a result, the charging of the capacitor (C5) increasing proportionally to the level of the input voltage (UE), and synchronism between the capacitor voltage (UC5) and the current (IL) through the inductance (L2) being achievable when there are variations in the input voltage (UE), and in that the two switches (V1, V2)



are switched off on reaching a certain value of the capacitor voltage (UC5).

4,967,139

TEMPERATURE-INDEPENDENT VARIABLE-CURRENT SOURCE

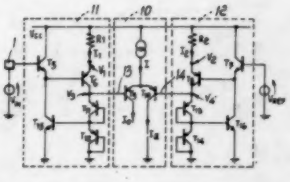
Giorgio Betti; Maurizio Zuffada, both of Milan; Fabrizio Sacchi, Gambarana, and Silvano Gornati, Casorezzo, all of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Agrate Brianza, Italy

Filed Apr. 16, 1990, Ser. No. 509,435

Claims priority, application Italy, Apr. 27, 1989, 20281 A/89

Int. Cl.[5] G05F 3/08

U.S. Cl. 323—312 **9 Claims**



1. A temperature-independent variable-current source, comprising a differential stage defining a first and a second input terminals and at least one differential output terminal, and a first and a second mutually identical buffers defining each an input terminal and an output terminal, said input terminals of said first and second buffers being connected respectively to a variable input voltage and to a reference voltage, said output terminals of said first and second buffers being connected respectively to said first and second input terminals of said differential stage, said buffers comprising resistive means defining a resistance and generating each a current which varies as a function of the voltages on said input terminals of said buffers and thermally depends only on said resistance, and said output terminals of said buffers providing each an output voltage which depends on said current, said output voltages being supplied to said differential stage to generate a temperature-independent current at said differential output terminal.

4,967,140

CURRENT-SOURCE ARRANGEMENT

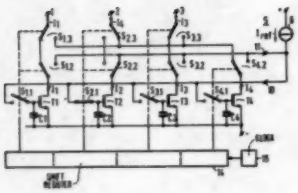
Dirk W. J. Groeneveld, and Hendrikus J. Schouwenaars, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

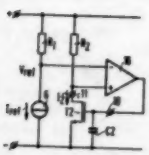
Filed Jul. 14, 1989, Ser. No. 380,163

Claims priority, application Netherlands, Sep. 12, 1988, 8802230; Jan. 30, 1989, 8900215

Int. Cl.[5] G05F *1/56*

U.S. Cl. 323—315 **22 Claims**





1. A current-source arrangement for supplying a required number of currents comprising:

a plurality of transistor circuit configurations for generating a plurality of substantially equal currents, and

correction means for reducing any mutual deviation in the currents from the transistor circuit configurations, characterized in that

the number of transistor circuit configurations is at least one larger than the required number of currents,

each transistor circuit configuration comprises a control transistor whose control voltage is adjustable to supply an adjustable first current, and

the correction means are adapted to make the current from each transistor circuit configuration equal to a reference-current in accordance with a cyclic pattern by adjusting the control voltage of the control transistor of each said transistor circuit configuration.

4,967,141

METHOD OF TAKING OUT AND STORING ENERGY IN A SUPERCONDUCTIVE RING OR COIL

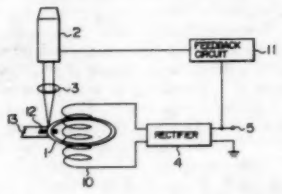
Masashi Kiguchi, and Yoshimasa Murayama, both of Koganei, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 24, 1988, Ser. No. 235,529

Claims priority, application Japan, Aug. 24, 1987, 62-208120

Int. Cl.[5] H01F *36/00*

U.S. Cl. 323—360 **17 Claims**



1. A method of taking out energy wherein a pulsed light ray is repetitively irradiated on a superconductive ring or coil storing energy to take out the stored energy.

4,967,142

ELECTRONIC MODULE COMPRISING A FIRST SUBSTRATE ELEMENT WITH A FUNCTIONAL PART, AND A SECOND SUBSTRATE ELEMENT FOR TESTING AN INTERCONNECTION FUNCTION, SOCKET, SUBSTRATE ELEMENT AND ELECTRONIC APPARATUS THEREFOR

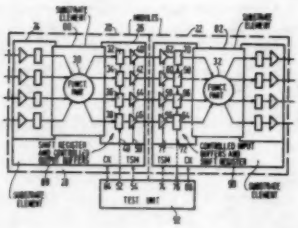
Wilhelm A. Sauerwald; Anwar Osseyran; Lars A. R. Eerenstein, and Franciscus G. M. De Jong, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 24, 1989, Ser. No. 342,414

Claims priority, application Netherlands, May 27, 1988, 8801362

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—73.1 **10 Claims**



1. An electronic module, comprising a first digital integrated circuit and test means for separately testing an interconnection function between the first integrated circuit and a second integrated circuit not within said module which can be connected to the first integrated circuit by way of said interconnection function, which test means comprise a shift register with a series connection for communication with a test unit, a first parallel connection to the interconnection function, and second parallel connection to a functional part of the first integrated circuit, there being provided a test selection mechanism for activating the series connection and the first parallel connection in a test state and for activating the first parallel connection in a test state and for activating the first and second parallel connections in an operating state, so that the shift register is transparent in the parallel direction, characterized in that said functional part is provided on a first substrate ele-

ment, said shift register and test selection mechanism being accommodated on a second substrate element, and said first and said second substrate element being physically fixed relative to one another by means of a fixing mechanism within said electronic module which has the standard dimensions of electronic modules.

4,967,143

SYSTEM FOR DIAGNOSING ANOMALIES OR BREAKDOWNS IN A PLURALITY OF TYPES OF ELECTRONIC CONTROL SYSTEMS INSTALLED IN MOTOR VEHICLES

Cesare Raviglione, and Paolo Rubino, both of Turin, Italy, assignors to Fiat Auto S.p.A., Turin, Italy

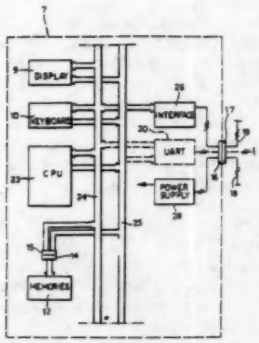
PCT No. PCT/EP87/00492, § 371 Date May 9, 1988, § 102(e) Date May 9, 1988, PCT Pub. No. WO88/02122, PCT Pub. Date Mar. 24, 1988

PCT Filed Aug. 31, 1987, Ser. No. 208,360

Claims priority, application Italy, Sep. 9, 1986, 67696 A/86

Int. Cl.[5] G01R *31/00, 31/28*

U.S. Cl. 324—73.1 **4 Claims**



1. System for diagnosing anomalies or breakdowns in a plurality of types of electronic control systems (S) installed in motor vehicles with internal combustion engines, each type of control system (s) including a respective plurality of sensors (2) for sensing the operating conditions of the engine and electrically-controlled actuator means (3) connected to an electronic control and operating unit (1), which is usually different for each type of control system (S), the unit (1) having at least one output (5) and being programmed to carry out the auto-diagnosis of anomalies or breakdowns in the control system (S) and to provide at the output (5) serial electrical auto-diagnosis signals containing information on the operating conditions of the control system (S), characterised in that:

the different control systems (S) are each provided with an identical standard electrical connector (6) connected to the output (5) of the respective control unit (1),

the electronic unit (1) of each system is arranged to output at the output (5) a serial-coded identification message of the type of control system (S) to which the unit (1) belongs, each time it (1) is activated;

the system further includes test apparatus or a tester (7) having an electrical connector (27) which can be coupled to the standard connector (6) and including a visual display device (9) and an operating keyboard (10) connected to a microprocessor control unit (23) having memory means (12) in which a plurality of diagnosis programmes are held, each of which relates to a corresponding type of control system (S), the microprocessor unit (23) being arranged to decode the identification messages output by the different control units (1) and to render operative the diagnosis programme corresponding to the type of system (S) indicated in the identification message at that moment, wherein the electronic unit (1) in each control system (S) is arranged to generate a serial identification message with the NRZ (non-return to zero) code.

4,967,144

ELECTRICAL SIGNAL OBSERVING DEVICE FOR CONVERTING AN ELECTRICAL SIGNAL TO BE MEASURED INTO AN OPTICAL INTENSITY WAVEFORM

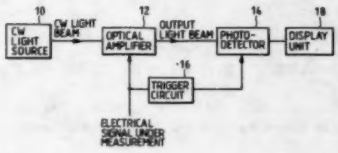
Shinichiro Aoshima, and Yutaka Tsuchiya, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 26, 1989, Ser. No. 357,824

Claims priority, application Japan, May 31, 1988, 63-133420

Int. Cl.[5] G01R *13/20*

U.S. Cl. 324—96 **8 Claims**



1. An electrical signal observing device having an optical signal as a probe for converting the waveform of an electrical signal to be measured into an optical intensity waveform to obtain an observation signal, comprising:

a light source for generating a continuous wave optical signal;

optical amplifying means for amplifying said optical signal with a gain controlled by the electrical signal to be measured;

a photodetector operative when activated for detecting said amplified optical signal and generating an observation signal;

a trigger circuit for activating said photodetector in synchronization with the electrical signal to be measured; and

a display unit for displaying the observation signal from said photodetector.

4,967,145

ACTIVE CURRENT TRANSFORMER

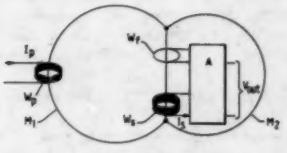
Christopher P. Davies, Fen Drayton, England, assignor to LGZ Landis & Gyr Zug, AG, Switzerland

Filed Mar. 3, 1989, Ser. No. 318,796

Claims priority, application United Kingdom, Mar. 4, 1988, 8805245

Int. Cl.[5] G01R *19/00, 15/02*

U.S. Cl. 324—127 **16 Claims**



1. An active current transformer comprising:

first and second magnetic circuits;

a primary conductor in which a current is to be measured;

a secondary conductor in which a measuring current is generated in use;

a feedback sensor, said sensor providing an induced voltage; and

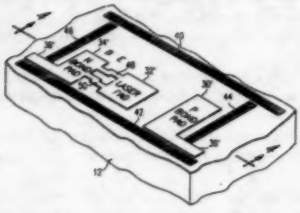
an amplifier for receiving a signal induced in said feedback sensor and generating said measuring current in said secondary conductor; wherein said primary and secondary conductors are located in said first and second magnetic circuits respectively, said first and second circuits having a common path over at least a part of their respective lengths and said feedback sensor being disposed on said common path, whereby, the magnetic flux in said second circuit can be made substantially equal and opposite to that in said first circuit by operation of said amplifier in response to said voltage in said feedback sensor.

4,967,146

SEMICONDUCTOR CHIP PRODUCTION AND TESTING PROCESSES

Peter J. Morgan, Allen, and Robert O. Miller, The Colony, both of Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 15, 1989, Ser. No. 351,718
Int. Cl.[5] G01R *31/00*
U.S. Cl. 324—158 R **7 Claims**



1. A solid-state wafer suitable for dicing after burn-in and testing of the chips on said wafer comprising, in combination:

wafer semiconductor substrate means having <100> orientated opposing sides;

a plurality of first V-grooves extending across the opposing sides of said substrate means, precisely aligned with one another, forming a grid of parallel lines on each side and having the vertices thereof following the <110> crystallographic planes of the substrate means;

a plurality of sets of non-interconnecting etched second V-grooves having the vertices thereof following the <110> crystallographic planes of the substrate means and extending across the opposing sides of said substrate means where each set of second V-grooves defines a dash line extending substantially across said wafer means orthogonal said first V-grooves to define a plurality of die;

an electrical solder pad on each defined die;

active electrical device means attached to said solder pads; and

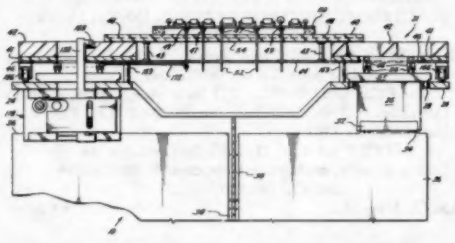
electrical connection means, connecting solder pads of adjacent die through the areas between said etched V-groove areas in a series electrical connection to facilitate burn-in of said active electrical device means, the dicing process resulting in breakage of said electrical connection means in the vicinity of the sets of etched V-groove areas defining broken lines.

4,967,147

CIRCUIT TESTER HAVING MECHANICAL FINGERS AND POGO PROBES FOR CAUSING ELECTRICAL CONTACT WITH TEST FIXTURE ASSEMBLIES

Ernest C. Woods, Jr., Pleasant Hill, and John B. Burnett, Vacaville, both of Calif., assignors to Zehntel, Inc., Walnut Creek, Calif.

Filed May 26, 1988, Ser. No. 199,016
Int. Cl.[5] G01R *5/28, 19/00*
U.S. Cl. 324—158 F **20 Claims**



1. Apparatus for testing printed circuit boards comprising:

(a) a cabinet for housing two rows of driver/receiver circuit boards in vertically disposed, side-by-side relation;

(b) a separate multi-channel driver/receiver connector mounted on the upper edge of each driver/receiver circuit board to form two rows of driver/receiver connectors, each driver/receiver connector having a separate pogo probe for each channel, each pogo probe having:

(i) a probe at a first end to mate with an insulation displacement device, and

(ii) a contact at a second end to mate with a contact on a driver/receiver board;

(c) a platen adapted to fit over the cabinet and the driver/receiver connectors, and having a top surface and a bottom surface and two opposite sides corresponding to the two sides of the cabinet;

(d) a plurality of pull-down assemblies mounted along each side of the platen, each pull-down assembly located between driver/receiver connectors, each pull-down assembly including a pull-down member which is vertically movable between a first extended position and a second retracted position relative to the platen;

(e) reversible drive means connected to the pulldown assemblies and operable to move the pulldown members in unison between the first and second positions;

(f) a test fixture assembly comprising a central test fixture having top and bottom planar surfaces and two fixture interfaces attached to opposite sides of the central test fixture; the test fixture assembly configured to fit over the platen with each fixture interface positioned over a corresponding row of pull-down assemblies and driver/receiver connectors, the top planar surface adapted to receive the solder side of a printed circuit board; and each fixture interface having an upper surface and a lower surface;

(g) a plurality of pogo probe connectors mounted in the test fixture, each probe connector having a probe end adapted to contact the solder side of a printed circuit board received on the top planar surface, and each probe connector having a wire-wrap post extending below the test fixture;

(h) rows of insulation displacement devices mounted on the lower surface of each fixture interface, a separate such row being vertically above and aligned with each driver/receiver connector; and

(i) a plurality of conductors mounted on the bottom planar surface of the test fixture, each conductor connecting one wire-wrap post with one insulation displacement device.

4,967,148

APPARATUS FOR ELECTRICAL FUNCTION TESTING OF WIRING MATRICES, PARTICULARLY OF PRINTED CIRCUIT BOARDS

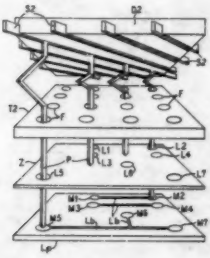
Guenter Doemens, Holzkirchen, and Thomas Rose, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 164,856, Mar. 7, 1988, Pat. No. 4,897,598. This application Aug. 28, 1989, Ser. No. 398,430

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1987, 3710594

Int. Cl.[5] G01R *31/02, 1/04*

U.S. Cl. 324—158 F **11 Claims**



8. An apparatus for electrical function testing of printed circuit boards having a plurality of measuring locations, the apparatus having a carrier plate in which a plurality of contact elements are arranged for contacting said measuring locations, comprising:

an intermediate mask located between the printed circuit board and the carrier plate, the intermediate mask having a predetermined pattern of holes in alignment with selected measuring locations of the plurality of measuring locations thereby allowing contacting of the selected measuring locations by corresponding contact elements and preventing contacting of non-selected measuring locations by corresponding contact elements; and

a cover plate having a plurality of parallel spaced busbars, said cover plate located adjacent an opposite side of said carrier plate from the intermediate mask, an electrical connecting established from a selected busbar to a selected measuring location via the corresponding contact element in the carrier plate and via the corresponding hole in the intermediate mask, each of said busbars interconnecting a number of contact elements of said plurality of contact elements, each of said contact elements being a resilient test probe.

4,967,149

DRIVE DEVICE FOR AN APPARATUS FOR ELECTRICAL FUNCTION TESTING OF WIRING MATRICES

Guenter Doemens, Holzkirchen; Thomas Rose; Detlef Hoffmann, both of Munich, and Arnold Heisen, Garching, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

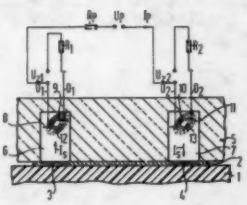
Filed Dec. 19, 1988, Ser. No. 286,347

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743390

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—158 F **9 Claims**

1. A drive device for electrical function testing of wiring matrices, particularly of printed circuit boards, having a carrier plate located over the wiring matrices the carrier plate having a plurality of gas discharge channels each provided with at least first and second electrodes, whereby at least two selected measuring locations (test points) of a wiring matrix are contactable via the allocated gas channels and their electrodes, respectively, whereby every channel being equipped with at least two electrodes is selectable based on a coincidence principle via a plurality of first and second electrode bus lines allocated to these electrodes, first electrodes of the channels being connected in series via the first electrode bus lines and second electrodes of the channels being connected in series via the second electrode bus lines, comprising a voltage (U_{z1}) being applied to a first electrode bus line (O_1) and to a second electrode bus line (U_1) for a first selected channel, this voltage (U_{z1}) being adequate to ignite a gas discharge between the first and second electrode bus lines (O_1, U_1) in the first selected channel; and further, a voltage (U_{z2}) being applied to the first



electrode bus line (O_2) and to the second electrode bus line (U_2) for a second selected channel, the voltage (U_{z2}) being adequate to ignite a gas discharge between the first and second electrode bus lines (O_2, U_2) in the second selected channel; and, for testing for a conductive connection between the first and second channels, a difference (U_p) in potential being applied between the gas discharges, this difference in potential (U_p) effecting a current conduction (I_p) from the gas discharge between the first and second elected bus liens (O_1, U_1) in the first channel to the gas discharge between the first and second electrode bus lines (O_2, U_2) in the second channel via conductive connection between the two selected measuring locations when a conductive connection exists.

4,967,150

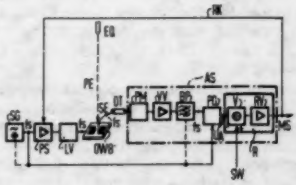
METHOD AND APPARATUS FOR PHASE MEASUREMENT OF SIGNALS AT A MEASURING POINT BY AN UNMODULATED PARTICLE BEAM

Hans D. Brust, Dudweiler, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 245,378

Int. Cl.[5] G01R *25/00, 31/26*

U.S. Cl. 324—158 R **35 Claims**



4. A method for phase measurement of specimen signals at a measuring point on a specimen, whereby at least one point on a surface of the specimen is scanned by a particle beam and whereby a secondary electrical signal is derived via a detector at the scanned measuring point on the surface of the specimen and is supplied to an evaluation unit having a phase detector, and whereby the specimen is supplied with drive signals, comprising the phase of the secondary electrical signal being kept

constant at the phase detector; the phase difference being kept constant in the steepest section of an output characteristic curve of the phase detector between the secondary electrical signal and a reference signal.

4,967,151

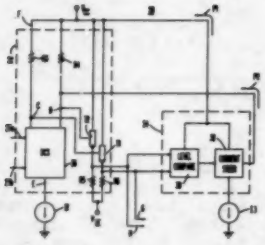
METHOD AND APPARATUS FOR DETECTING FAULTS IN DIFFERENTIAL CURRENT SWITCHING LOGIC CIRCUITS

Arnold E. Barish; David A. Kiesling, both of Pleasant Valley; Mark D. Mayo, Poughkeepsie, and Walter A. Svarczkopf, Walden, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 232,978, Aug. 17, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,690

Int. Cl.[5] G01R *31/00, 31/26*

U.S. Cl. 324—158 T **22 Claims**



1. A method of testing an electronic logic circuit of the type responsive to an input signal for generating first and second differential output signals, said method comprising the steps of:

applying said input signal to said logic circuit;

sensing, by comparing at least two discrete signals, said potential difference between said first and second differential output signals; and

shifting, when said potential difference is less than a stuck-near-threshold level, said first and second differential output signals at least a minimum potential difference apart.

4,967,152

APPARATUS INCLUDING A FOCUSED UV LIGHT SOURCE FOR NON-CONTACT MEASUREMENT AND ALTERATION OF ELECTRICAL PROPERTIES OF CONDUCTORS

Joseph M. Patterson, Mission Viejo, Calif., assignor to Ultra-Probe, Laguna Hills, Calif.

Division of Ser. No. 166,978, Mar. 11, 1988, which is a continuation of Ser. No. 914,719, Oct. 3, 1986. This application Oct. 24, 1988, Ser. No. 261,687

Int. Cl.[5] G01R *19/00, 31/00*

U.S. Cl. 324—158 R **22 Claims**

1. Apparatus for performing non-contact measurement and alteration of electrical properties of conductors comprising,

source means for providing a focused beam of UV light,

sample holder means for supporting a sample means to be operated upon by directing said focused beam of light thereon and producing a reflection of at least a portion of said focused beam of light by said sample means,

said sample means includes an electrical current carrying portion,

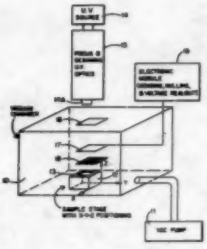
said source means and said sample holder means adapted for movement relative to each other,

circular polarizer means interposed between said sample means and said source means for circularly polarizing said focused beam of light before it is directed onto said sample means,

chamber means wherein said sample holder means is disposed for supporting said sample means for receiving said focused beam,

pressure control means for selectively altering the pressure within said chamber means, and

output detection means for detecting a characteristic of said sample means supported on said sample holder means as determined by directing said focused beam of light thereon,



said output detection means includes circular polarizer analyzer means for detecting the angle of rotation of said focused beam of UV light after reflection from said sample means,

said angle of rotation is a function of the magnetic field generated around said electrical current carrying portion of said sample means which magnetic field is a function of the magnitude of the current in said current carrying portion of said sample means.

4,967,153

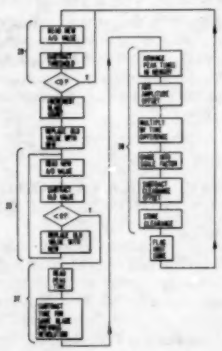
EDDY CURRENT TURBOMACHINERY BLADE TIMING SYSTEM

Lawrence W. Langley, 910 Cardinal Dr., Christiansburg, Va. 24073

Division of Ser. No. 904,979, Sep. 8, 1986, Pat. No. 4,847,556. This application Jul. 5, 1989, Ser. No. 375,738

Int. Cl.[5] G01P *3/48, 3/54;* **G01B** *7/14;* **G01M** *1/00*

U.S. Cl. 324—174 **6 Claims**



1. A device for measuring the transit times of electrically conductive moving parts of a machine, comprising:

(a) a magnet having two poles for producing a static field of magnetic flux in a region traversed by said moving parts;

(b) a coil inductively coupled to said region for producing signals from the magnetic field of eddy currents in said moving parts;

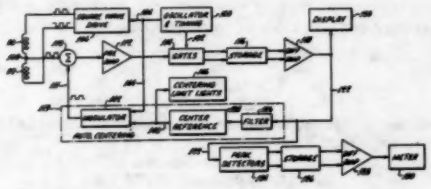
(c) timer means connected to said coil for measuring the times of said signals;
(d) counting means for maintaining a count of said signals; and
(e) means connected to said timer means and said counting means for storing said times in association with current values of said count.

4,967,154

DYNAMIC TUBE RUNOUT MEASURING METHOD AND APPARATUS WITH SQUARE WAVE ENERGIZED RELUCTANCE MEASURING COILS

William F. Marantette, Torrance, Calif., assignor to Optima Industries, Inc., Torrance, Calif.

Filed Sep. 13, 1989, Ser. No. 406,578
Int. Cl.[5] G01B 7/31, 7/14; G01H 11/02; B23B 49/00
U.S. Cl. 324—207.12 **14 Claims**



6. Apparatus for sensing wobble of a rotatable member mounted in a rotor having a support in which the rotor is journalled, said apparatus comprising:
a housing configured and arranged to be fixedly supported with respect to the rotor support and to extend along said rotatable member,
first and second magnetic cores,
core mounting means for mounting the cores to the housing, said cores being configured and arranged in said housing to be nominally equally spaced from said rotating member on opposite sides thereof, each core forming part of a magnetic circuit including a gap between the core and the rotating member, whereby reluctance of such magnetic circuits will vary with the length of said gaps,
first and second coils on said cores respectively,
a driving signal source having an alternating signal output connected to energize said coils, whereby coil signals are generated in said coils.
means for differentially combining said coil signals to generate a sensor signal having a magnitude indicative of the wobble of said rotating member, and
output means for indicating said magnitude,
said alternating signal output comprising a pair of square waves of mutually opposite phase, said sensor signal being a square wave having first and second successive half cycles with leading edges, means for sampling successive half cycles of said square wave sensor signal at times delayed from the leading edges thereof, and means for indicating difference between individual samples of pairs of said samples as a measurement of wobble of said rotatable member.

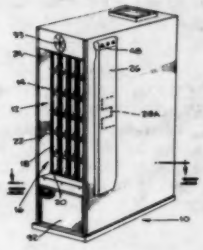
4,967,155

ENVIRONMENTALLY CONTROLLED MEDIA DEFECT DETECTION SYSTEM FOR WINCHESTER DISK DRIVES

Vernon P. Magnuson, Canoga Park, Calif., assignor to Micropolis Corporation, Chatsworth, Calif.

Filed Apr. 8, 1988, Ser. No. 179,512
Int. Cl.[5] G01R 33/12, 31/02; H05K 5/00, 7/00
U.S. Cl. 324—212 **9 Claims**

1. A system for testing Winchester disk drives comprising:
a testing cabinet including first and second sections;
said first section including means for environmentally controlling the temperature therein at an elevated temperature,
said second section being thermally insulated from said first section;
said first section including a plurality of racks for receiving Winchester drives to be tested;



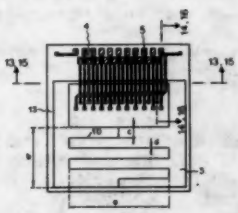
said second section including a plurality of individual test units each coupled via separate coupling means to a corresponding one of said Winchester drives;
said test units each including means for applying digital memory medium test signals to said drives, for reading said signals from said drives, and for determining malfunctions in each of said drives.

4,967,156

THIN FILM HIGH PERMEABILITY MAGNETIC CORE FLUX GATE DEVICE FOR MEASURING A WEAK MAGNETIC FIELD

Thomas Seitz, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Division of Ser. No. 121,536, Nov. 17, 1987, Pat. No. 4,864,238.
This application May 17, 1989, Ser. No. 353,233
Claims priority, application Switzerland, Nov. 25, 1986, 04711/86; Aug. 20, 1987, 03201/87
Int. Cl.[5] G01R 33/05; G07D 7/00; H01F 5/04, 10/26
U.S. Cl. 324—249 **8 Claims**



1. A device for measuring a weak magnetic flux comprising
a substrate,
a first insulating layer formed on said substrate,
first and second sets of conductors formed on said first insulating layer,
a second insulating layer formed over said sets of conductors on said first insulating layer,
a magnetic core in the form of a surface film formed on said second insulating layer and having a magnetic permeability of at least about 10^5 and a maximum thickness of less than about 10 microns,
a first set of bonding wires passing through said second insulating layer over said magnetic core and back through said second insulating layer to connect said conductors of said first set to form a first coil coupled to said magnetic core,

pulsing means coupled to said first coil for providing electrical current pulses to said first coil so that said magnetic core is driven intermittently into magnetic saturation, and

a second set of bonding wires passing through said second insulating layer over said core and back through said second insulating layer to connect said conductors of said second set to form a second coil coupled to said magnetic core,

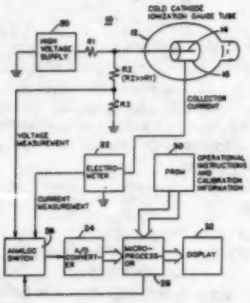
said second coil serving as a source of an output signal when a current signal is applied to said first coil.

4,967,157

METHOD AND CIRCUIT FOR EXTENDING THE RANGE OF A COLD CATHODE DISCHARGE VACUUM GAUGE

Roy N. Peacock, Lafayette, Colo., assignor to MKS Instruments, Inc., Andover, Mass.

Filed Aug. 29, 1988, Ser. No. 237,704
Int. Cl.[5] G01L *21/34, 21/30*
U.S. Cl. 324—460 **39 Claims**



1. A cold cathode ionization gauge controller for measuring the pressure of a gas comprising:

means for measuring the electrical resistance of a cold cathode ionization gauge in communication with the gas where said measuring means includes means for measuring the current through the gauge and means for measuring the voltage across the gauge and means for dividing the measured voltage by the measured current to obtain said electrical resistance; and

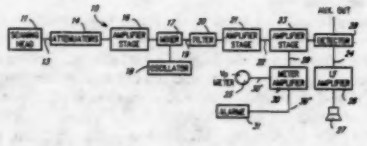
means for translating said electrical resistance to said pressure of the gas.

4,967,158

PORTABLE DETECTOR DEVICE FOR DETECTING PARTIAL ELECTRICAL DISCHARGE IN LIVE VOLTAGE DISTRIBUTION CABLES AND/OR EQUIPMENT

Antonio Gonzalez, Greenfield Park, Canada, assignor to Hydro-Quebec, Montreal, Canada

Filed Mar. 31, 1989, Ser. No. 331,293
Int. Cl.[5] G01R *31/12, 31/08*
U.S. Cl. 324—536 **14 Claims**



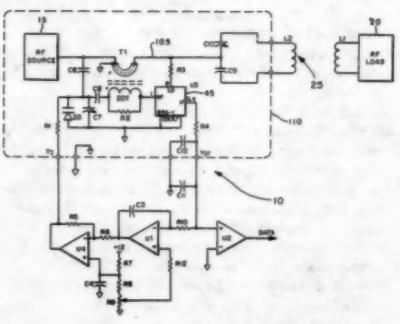
1. A portable detector device for detecting partial electrical discharge in live voltage distribution cables and/or equipment, said device comprising a probe secured to an insulated portable means for manual displacement of said probe in the vicinity of said distribution cables and/or equipment, a detector circuit connected to said probe for detecting a partial discharge signal in the range of 5 to 10 MHz emitted by said partial-discharge, said detector device having an input attenuator circuit connected to said probe to lower the level of said detected signal to a desired level, transformation circuit means including a mixing circuit for mixing said detected partial discharge signal with a known frequency signal from a local oscillator circuit to change said detected signal to a predetermined frequency signal substantially free of noise and representative of the magnitude of said detected partial discharge signal, amplifier circuit means to amplify said predetermined frequency signal without amplifying any noise in said discharge signal, said amplifier circuit means also dividing said predetermined frequency signal to feed an audio frequency amplifier to provide an output audio signal free of said carrier signal and representative of said detected signal only and further to feed a measuring and alarm circuit means for generating signals indicative of the presence and magnitude of partial discharge.

4,967,159

SELF-BALANCING REFLECTOMETER

Michael R. Manes, Littleton, Colo., assignor to Abbott Laboratories, Abbott Park, Ill.

Filed Feb. 23, 1989, Ser. No. 315,371
Int. Cl.[5] H04B *1/04;* H03H *7/40*
U.S. Cl. 324—650 **46 Claims**



1. Self-balancing reflectometer apparatus for detecting impedance variations in an RF load in a system including an RF source, RF load, and RF transmission channel linking said source and load for carrying RF signals, characterized by a load voltage and a load current, transmitted by said source and to said load, comprising:

means in communication with said transmission channel for generating a first sample signal having value related to the load current by a predetermined fixed first value of gain;

means in communication with said transmission channel for generating a variable second sample signal having value related to the load voltage by a variable second value of gain;

means for subtracting said first sample signal and said second sample signal to generate a difference signal;

means responsive to said difference signal for generating an intermediate signal having value that varies with said difference signal, thereby providing a detectable indication of such variations; and

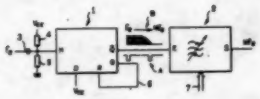
means responsive to variations of said intermediate signal for automatically adjusting said variable second value of gain to a value necessary to drive said difference signal to zero, thereby automatically balancing said reflectometer to said another value of load impedance.

4,967,160

FREQUENCY MULTIPLIER WITH PROGRAMMABLE ORDER OF MULTIPLICATION

Didier Quievy, Massy, and Francis Desjouis, Maintenon, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Jun. 22, 1989, Ser. No. 369,859
Claims priority, application France, Jun. 24, 1988, 88 08528
Int. Cl.[5] H01B 19/00
U.S. Cl. 328—16 6 Claims



1. A frequency multiplier circuit with variable multiplication order comprising a comb generator that receives, at input, a signal at the base frequency to be multiplied, and gives , at output, a composite pulse signal having a plurality of harmonic lines of the base frequency, said comb generator being followed by a pass-band filter that can be tuned selectively to one of these harmonic lines, and comprising logic means having two complemented outputs, one synchronous input, the actuation of which controls the changing of these outputs from one logic state to the other, and one asynchronous input, the actuation of which controls, independently of the state of the synchronous input, the changing of these outputs to the states complementary to those generated by the actuation of the synchronous input;

the base frequency signal being biased beforehand so that its excursion makes place around the transition voltage controlling the change from one logic state to the other, said signal being applied to the synchronous logic means, a first output of these means being connected to the asynchronous input and the second output delivering said composite pulse signal to the pass-band filter located downstream.

4,967,161

SIGNAL PROCESSING METHOD AND APPARATUS

Takashi Furuhata, Kamakura; Hiroaki Takahashi, and Manabu Katsuki, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,958
Claims priority, application Japan, Aug. 24, 1988, 63-208375
Int. Cl.[5] H03K 7/06, 11/0
U.S. Cl. 328—22 23 Claims

1. A signal processing method in which an input signal of a first frequency characteristic is converted to a signal of a second predetermined frequency characteristic, and the resulting signal is reconverted to a signal of the first original frequency characteristic, comprising:

(a) first signal processing means

(1)having as a first transfer function the function

$$\exp(-msT)/(1+K\cdot\cos(\omega T))$$

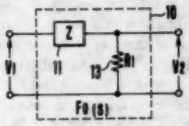
where ω is the angular frequency of the input signal, s is the complex angular frequency of $j\omega$, T is a constant having the unit of time, K is a constant equal to, or smaller than, 1 (unity) and m is an integer, or a function approximating to the former function; and

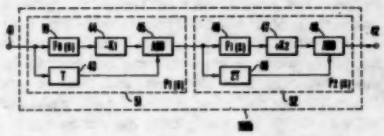
(2) for processing the input signal thereto in accordance with at least the first transfer function in a predetermined frequency band;

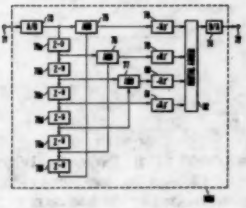
(b) second signal processing means

(1) cascaded with the first signal processing means;

(2) having a transfer function represented by







$(1+K\cdot\cos(\omega T))\cdot\exp(-sT)$; and

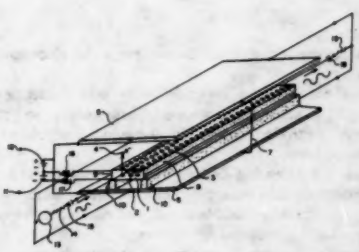
(3) for processing the input signal in accordance with at least the second transfer function.

4,967,162

STRIPLINE TRAVELING WAVE DEVICE AND METHOD

Larry R. Barnett, Westminster, Colo., and Robert M. Phillips, Redwood City, Calif., assignors to Star Microwave, Campbell, Calif.

Filed Jan. 28, 1988, Ser. No. 149,375
Int. Cl.[5] H03F 3/58
U.S. Cl. 330—43 25 Claims



1. A stripline traveling wave device comprising

a cathode stripline including means for ejecting electrons from one surface thereof in response to applied electric fields,

a conducting plate insulated from and disposed opposite and spaced from said one surface,

a second conductive means insulated from and disposed to electrically cooperate with the opposite surface of said cathode stripline,

a gate stripline insulated from and disposed betwee. said conducting plate and said cathode stripline and serving to propagate r.f. signals applied thereto with r.f. electric fields extending in opposite directions between said gate stripline and conducting plate and between said gate stripline and cathode stripline and second conductive means whereby the r.f. voltage between said gate stripline and conducting plate is greater than the r.f. voltage between said gate stripline and cathode stripline, and

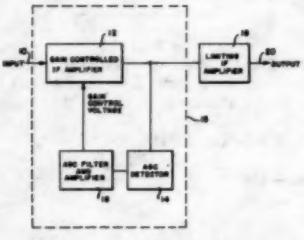
means for applying a DC voltage in the same direction between said conducting plate and gate stripline and between the gate stripline and the cathode stripline to accelerate electrons ejected from said cathode to said conducting plate, said gate stripline being constructed for minimum interception of electrons, said electrons traveling through the gate stripline to the conducting plate interacting with the r.f. electric fields to transfer energy to the r.f. propagating signals.

4,967,163

COMBINED LIMITING/AGC IF SYSTEM

James E. Kletzer, Chicago, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 17, 1973, Ser. No. 398,277
Int. Cl.[5] H03F *1/36*
U.S. Cl. 330—86 1 Claim



1. A device of regulating fluctuating input electrical signals comprising:

gain control means for amplifying said fluctuating input signal in accordance with a control voltage to produce a gain controlled output signal having a regulated output signal level;

means for detecting said regulated output signal level and producing said control voltage in accordance with a difference in magnitude between said regulated output signal level and a predetermined level;

means for limiting instantaneous changes in said regulated output signal level;

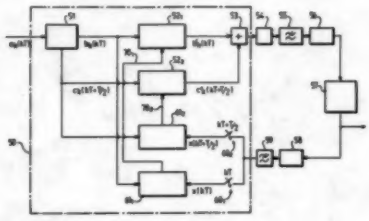
whereby said input signal is regulated instantaneously its overall dynamic range without increasing gain to allow noise during signal fades but still responding to additional input signals if said input signal disappears permanently.

4,967,164

ADAPTIVE PREDISTORTION CIRCUIT

Hikmet Sari, Creteil, France, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Sep. 14, 1989, Ser. No. 407,380
Claims priority, application France, Sep. 30, 1988, 88 12805
Int. Cl.[5] H03F *1/26*
U.S. Cl. 330—149 3 Claims



1. Adaptive predistortion circuit for a digital transmission system which transmits input data at the rate of a symbol clock having a period T with the aid of a modulator and a power amplifier which distorts the data, the circuit comprising:

a predistortion circuit predistorting in the opposite sense the input data prior to their entering the amplifier in order to transmit the expected input data,

an adaptation circuit continuously adapting the predistortion circuit to the stream of transmitted data in response to a demodulation of the stream of transmitted data,

and a filter performing a signal shaping,

characterized in that the circuit comprises an encoder generating, on the basis of digital data a_k (k being an integer):

on a first path, digital data b_k leaving a first predistortion circuit in a predistorted condition, in-phase with the symbol clock,

on a second path, digital data c_k leaving a second predistortion circuit in a predistorted condition, in phase-opposition to the symbol clock,

the signals b_k and c_k being obtained by means of an n-th order polynomial encoding of the type of $F(D)=(1+D)^n$ where D is a delay of a half symbol period and where F is a function applied to the data a_k, these signals having a frequency shaping such that

$$F(\omega)=\cos^n(\omega T/4) \text{ for } |\omega| \leq 2\pi/T$$

where n is a positive integer, these signals being encoded such that

$$b_k = \sum_{i=0}^{I} C_n^{2i}\, a_{k-i}$$

$$c_k = \sum_{j=0}^{J} C_n^{2j+1}\, a_{k-j}$$

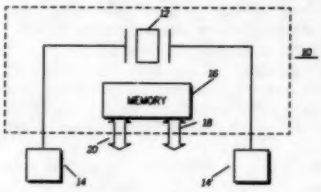
where I is the integer part of n/2 and where J is the integer part of $(n-1)/2$ the coefficients C_n^{2i} and C_n^{2j+1} being the coefficients of Newton's binomial theorem, the predistorted data of the two paths being added together in an adder, then transformed into an analog signal by an digital-to-analog filter, this analog signal being filtered by the filter for obtaining a bandwidth limitation $(-1/T, 1/T)$, then transmitted to the modulator and thereafter to the amplifier, the adaptation being effected after the demodulation of the transmitted data with the aid of two adaptation circuits, one of which operating in-phase with and the other in phase-opposition to the symbol clock for adapting the corresponding predistortion circuit.

4,967,165

CRYSTAL REFERENCE FOR USE IN OSCILLATOR CIRCUIT

King F. Lee, Hollywood, and Frederick L. Martin, North Lauderdale, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 14, 1989, Ser. No. 310,138
Int. Cl.[5] H03B *5/32*
U.S. Cl. 331—66 **20 Claims**



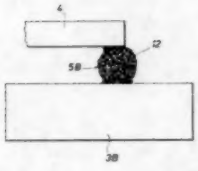
1. A reference element for use in an oscillator, comprising:
a resonant circuit positioned in a housing; and
means for permanently storing information within said housing representing predetermined operational characteristics of said resonant circuit.

4,967,166

CRYSTAL OSCILLATOR AND METHOD FOR MOUNTING THE SAME

Emerson C. Marcellus, Pasadena, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Dec. 7, 1989, Ser. No. 447,304
Int. Cl.[5] H01L *41/08*; H03B *5/36*
U.S. Cl. 331—116 R **20 Claims**



1. A crystal oscillator including a crystal element designed to oscillate at a given frequency when subjected to an exciting voltage, and mounted on a base through connecting means, wherein said connecting means includes at least a wad made of at least one turn of at least one thin wound wire.

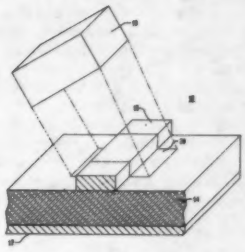
4,967,167

MICROWAVE TRANSMISSION LINE AND METHOD OF MODULATING THE PHASE OF A SIGNAL PASSED THROUGH SAID LINE

Richard A. Neifeld, Springfield, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 5, 1990, Ser. No. 474,976
Int. Cl.[5] H03C *3/00, 3/36*; H01P *1/18, 9/00*
U.S. Cl. 332—144 **8 Claims**

1. A microwave transmission line including a metallic ground plane layer, a relaxor dielectric layer overlaying the metallic ground plane layer, and a metal stripline overlaying a portion of the relaxor dielectric layer and wherein the relaxor dielectric layer includes a dielectric material having a very high dielectric constant of greater than 1000, low dielectric



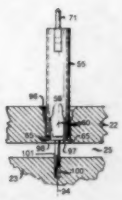
loss and large variations of the real part of the dielectric constant with varying temperature.

4,967,168

COAXIAL-WAVE GUIDE COUPLING ASSEMBLAGES

Edward V. Bacher, Berkeley Heights, and Robert E. Myer, Denville, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 31, 1989, Ser. No. 401,364
Int. Cl.[5] H01P *1/04, 5/103*
U.S. Cl. 333—26 **6 Claims**



1. The improvement in an assemblage comprising: a waveguide structure comprising, first and second vertically spaced horizontal metal walls bounding opposite sides of a wave-propagation chamber providing for horizontal passage between such walls of high frequency electromagnetic energy, such first and second walls having respectively formed therein relatively large and small vertical coaxial bores of which the large bore passes through said first wall to said space, and the small bore extends from such space at least partly through said second wall; and a coaxial coupler unit for such energy comprising: a tubular outer conductor having an axis and a front end and having a forward portion which extends axially rearward from the front end of such outer conductor, and an axially elongated inner conductor passing in spaced coaxial relation forwardly through said outer conductor and having, in its length, central and forward sections which are, respectively, disposed within said outer conductor and in front of such outer conductor to provide by the latter section a pin projecting axially outward and forward from the front end of said outer conductor, said pin having a forward portion which extends axially rearward from the front end of said pin, said coaxial unit being vertically aligned with the common axis of said coaxial bores and having a lower part inserted in such bores so that at least respective parts of said forward portion of said outer conductor and said pin are respectively received in said large and small bores in, respectively, said first and second metal walls to make electric contacts with metallic surface regions of such two walls extending around said bores at the sides thereof; and said improvement comprising the features

that the surface of said first wall on the interior wall surface of said large bore and said forward portion of said outer conductor have a region of mutual contact angularly extending all around such portion and axially disposed adjacent to the opening of said large bore into said chamber, said first wall exerting radially inward force on such forward portion to produce therebetween a pressure contact distributed around such region, the axial extent of such region of pressure contact being substantially less than a minority of the distance over which said outer conductor and the interior wall of said large bore are axially coextensive, and that the part of said outer conductor within said large bore and to the rear of said mutual contact region has over its length a largest outer diameter less by at least a clearance than the smallest inner diameter over said length of said large bore.

4,967,169

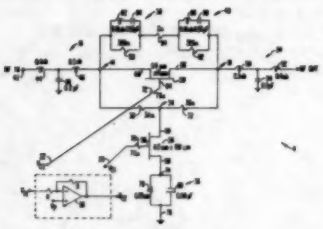
FET MONOLITHIC MICROWAVE INTEGRATED CIRCUIT VARIABLE SLOPE GAIN-EQUALIZER

Horng-Jye Sun, Fremont, and Bruce C. Morley, Cupertino, both of Calif., assignors to Teledyne MEC, Mountain View, Calif.

Filed Jul. 31, 1989, Ser. No. 388,094

Int. Cl.[5] H03H *11/06*

U.S. Cl. 333—28 R **23 Claims**



1. On a MMIC, a circuit for controlling substantially linearly the attenuation-versus-frequency slope characteristic of an RF microwave signal, the circuit comprising:

a circuit input port, having an input impedance, for receiving the RF microwave input signal from a signal source having a source impedance: the input signal having a frequency range between about DC and an uppermost frequency of about 18 GHz;

a circuit output port, having an output impedance, for supplying an attenuation fraction of the RF microwave input signal to a load having a load input impedance;

first and second control ports for receiving respectively first and second control signals whose amplitude varies the attenuation fraction of the RF microwave input signal reaching the circuit output port;

first and second attenuator elements connected together in series between the circuit input port and the circuit output port, the series connection of said attenuator elements defining a T-node;

a first frequency dependent resonator member having a first resonant frequency substantially equal to the uppermost frequency, said member having first and second leads wherein the second lead is grounded, for shunting to ground as a function of frequency a signal at the first lead whose frequency is less than the first resonant frequency;

a second frequency dependent resonator member having a second resonant frequency substantially equal to the uppermost frequency, connected in series with the RF circuit input port and the RF circuit output port, for shunting as a function of frequency to the RF circuit output port a signal at the RF circuit input port whose frequency is about the second resonant frequency and for attenuating as a function of frequency such signal when the signal frequency is less than the second resonant frequency;

symmetrical means, connected in shunt between the input and output ports and in series between the first lead of the first member and the T-node, and adapted to receive the first and second control signals, controllably connecting the first frequency dependent resonator member between the T-node and ground while simultaneously controllably shunting the second frequency dependent resonator member as a function of the first and second control signals, for causing the attenuation between the RF circuit input port and the RF circuit output port to vary substantially linearly as a function of frequency over a frequency range of DC to about 18 GHz, the attenuation being controlled by said symmetrical means and said control signals;

said symmetrical means, said first and second attenuator elements and said first and second frequency dependent resonator members including parasitics such that the circuit produces an attenuation at an uppermost frequency of interest that is substantially independent of the control signals;

the simultaneous controllably connecting and controllably shunting by said symmetrical means causing the input and output impedance of the circuit to remain substantially constant over said frequency range.

4,967,170

ROTARY WAVEGUIDE SWITCH HAVING ARCUATE WAVEGUIDES REALIZED BY PLANAR FACES

Eckart Hettlage, Karlsruhe, and Gerd Ruff, Heidelberg, both of Fed. Rep. of Germany, assignors to Teldix GmbH, Heidelberg, Fed. Rep. of Germany

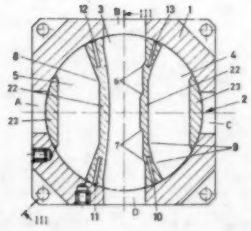
PCT No. PCT/EP87/00037, § 371 Date Aug. 8, 1988, § 102(e) Date Aug. 8, 1988, PCT Pub. No. WO87/04864, PCT Pub. Date Aug. 13, 1987

PCT Filed Jan. 28, 1987, Ser. No. 254,931

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1986, 3604077

Int. Cl.[5] H01P *1/10*

U.S. Cl. 333—106 **5 Claims**



1. In a waveguide switch including a housing having an axial bore and at least four waveguide ports extending to a circumference of said axial bore, each of said waveguide port having a rectangular cross section and being arranged in one plane transverse to a longitudinal axis of said bore and at right angles to one another in said plane, a cylindrical rotor disposed in said bore of said housing and provided with three waveguide passages having a corresponding, rectangular cross section so as to produce different waveguide connections between said waveguide ports in certain rotor potions, with one of said waveguide passages in the rotor being configured as a straight central passage and with the other two of said waveguide passages being disposed on respectively opposite sides of said one waveguide passage and with each of said other waveguide passages producing a deflection of the respective waveguide path by $\pi°$; the improvement wherein said one waveguide passage is given a cross-sectional taper toward the center of the rotor from each end of said one passage; and each of said other two of said waveguide passages has an at least approximately arcuate shape defined by respective faces of respective longitu-

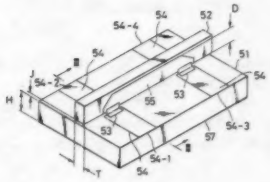
dinally extending walls of said rotor which delimit said other waveguide passages, each said wall being formed respectively of at least three planar face pieces with bends therebetween to approach said arcuate shape.

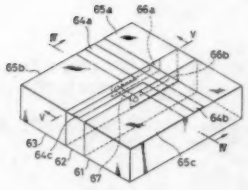
4,967,171

MICROWAVE INTEGRATED CIRCUIT

Kazuhiro Ban, and Atsuo Ojima, both of Amagasaki, Japan, assignors to Mitsubishi Danki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 4, 1988, Ser. No. 228,178
Claims priority, application Japan, Aug. 7, 1987, 62-198680; Aug. 7, 1987, 62-198681
Int. Cl.[5] H01P *5/18*
U.S. Cl. 333—116 14 Claims





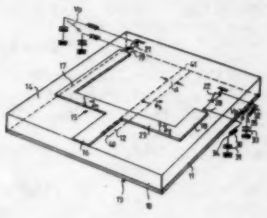
1. A microwave integrated circuit comprising:
first and second input/output substrates, respectively, having a top surface and a side surface adjacent to said top surface;
a plurality of input/output lines disposed on said top surfaces of said first and second input/output substrates;
a coupled-line substrate having first and second side surfaces and a top surface adjacent to said first and second side surfaces, and being disposed between said side surfaces of said first and second input/output substrates; and
first and second planar coupled lines being coupled to each other and disposed on said first and second side surfaces of said coupled-line substrate, said first and second planar coupled lines connected to said plurality of input/output lines;
wherein said first and second side surfaces of said coupled-line substrate having said first and second planar coupled lines formed thereon are, respectively, contacted with said first and second input/output substrates so that said top surface of said coupled line substrate is coplanar with said top surfaces of said first and second input/output substrates and said first and second side surfaces of said coupled-line substrate are substantially perpendicular to said top surfaces of said first and second input/output substrates having said plurality of input/output lines formed thereon.

4,967,172

MICROWAVE PHASE SHIFTER CIRCUIT

Joëlle Ariel, Paris, and Jacques Legendre, Longjumeau, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Mar. 28, 1989, Ser. No. 329,806
Claims priority, application France, Apr. 1, 1988, 88 04388
Int. Cl.[5] H01P *1/18*
U.S. Cl. 333—161 6 Claims



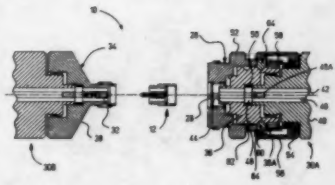
1. A microwave phase shifter circuit comprising:
a substrate made of dielectric material having two faces;
a slot line placed on one of said faces;
a strip line placed on the other of said faces, said strip line having the shape of a fork with two parallel branches connected by a transversal branch, perpendicular to the direction of said slot line, the lengths of said branches of the strip line differing by b/4 where b is the wavelength of the microwave signal;
two PIN diodes, each connected between the end of one of said branches and the ground; and
means to turn said PIN diodes simultaneously on or off so as to introduce an identical impedance variation in each of said branches, and thus to obtain a determined phase variation between an input wave, applied to one line of said slot line and said strip line, and the corresponding output wave appearing on the other line of said slot line and said strip line, when the state of said diodes is changed.

4,967,173

SHORT AIRLINE CALIBRATION STANDARDS AND METHODS FOR ERROR-CORRECTED MICROWAVE NETWORK ANALYSIS

Paul B. Watson, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 21, 1989, Ser. No. 396,506
Int. Cl.[5] H01P *1/04*
U.S. Cl. 333—260 16 Claims



1. A precision calibration standard, comprising:
a short coaxial airline, the coaxial airline being approximately one-quarter wavelength at a middle frequency of a given measurement frequency range, the coaxial airline comprising:
an inner conductor slidably connected at a first end by an adapter connected to a mating inner conductor of an external circuit; and

an outer conductor separate from the inner conductor of the coaxial airline, the outer conductor being coaxially disposed to the inner conductor and connected by the adapter to an outer conductor of the external circuit;

the adapter comprising a two-position nut which serves as a fixture for connection of the coaxial airline to the external circuit;

the outer conductor of the coaxial airline being attached coaxially with the inner conductor by the adapter to the external circuit.

4,967,174

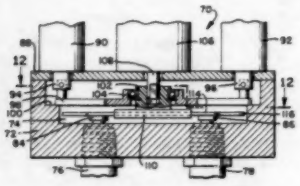
ROTATING COAXIAL SWITCH

Harold H. Yee, Rancho Palos Verdes, and James F. Hudson, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 23, 1989, Ser. No. 397,608

Int. Cl.[5] H01H *53/00*

U.S. Cl. 335—5 **20 Claims**



1. A rotating switch comprising:

a housing having a cavity therein;

a plurality of contact posts extending into said cavity;

at least one conductor positioned within said cavity so that said conductor can lie at a first position where it contacts a first pair of said posts and can lie in a second position wherein it contacts a second pair of said posts;

means for raising said conductor away from said first pair of posts;

means for moving said conductor from its first to its second position; and

means for lowering said conductor into contact with said second pair of posts.

4,967,175

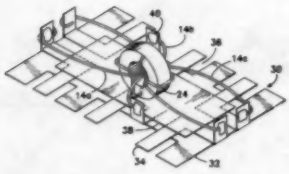
INDUCTOR AND CARRIER SUITABLE FOR ATTACHING TO A HYBRID SUBSTRATE OR THE LIKE

William E. Berg, and Jonathan C. Lueker, both of Portland, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 13, 1989, Ser. No. 435,212

Int. Cl.[5] H01F *15/02*

U.S. Cl. 336—65 **12 Claims**



1. An inductor and carrier suitable for attaching to a mounting substrate comprising:

(a) a film carrier having a periphery patterned with a plurality of windows and a plurality of conductors, each conductor having a bent-up tab and an end portion terminating at the periphery within the respective window for attachment to a mounting substrate; and

(b) an inductor core having a plurality of insulated windings, each winding being attached to the respective bent-up tab of each conductor.

4,967,176

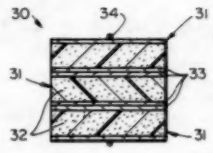
ASSEMBLIES OF PTC CIRCUIT PROTECTION DEVICES

David A. Horsma, Palo Alto; Hundi P. Kamath, Los Altos, and Shou-Mean Fang, Union City, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Jul. 15, 1988, Ser. No. 219,416

Int. Cl.[5] H02H *9/02*; H05B *3/12*

U.S. Cl. 338—22 R **9 Claims**



1. A device assembly which comprises at least three circuit protection devices connected in series, each of said devices comprising a laminar PTC element which is sandwiched between two laminar metal electrodes, the PTC elements being stacked on top of each other but separated by laminar metal electrodes.

4,967,177

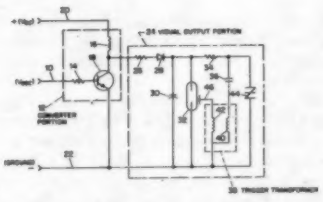
AUDIOVISUAL SIGNALING DEVICE AND METHOD

Luy B. Nguyen, Wayside, N.J., assignor to Wheelock, Inc., Long Branch, N.J.

Filed Sep. 11, 1989, Ser. No. 405,740

Int. Cl.[5] G08B *27/00*

U.S. Cl. 340—326 **24 Claims**



1. An audiovisual signaling device comprising in electrical connection:

(a) means for producing an auditory input and a corresponding low voltage oscillatory signal;

(b) converter means in electrical connection to the means for producing said auditory output and corresponding low voltage oscillatory signal, said converter means responsive to the low voltage oscillatory signal to repetitively produce a corresponding high voltage output intermittent spike signal;

(c) means for producing a visual output in electrical connection to said converter means; and

(d) means responsive to the high voltage intermittent spike signal and in electrical connection to said converter means to repetitively activate the visual output means.

4,967,178
APPARATUS FOR CONTROLLING A SEAT FOR VEHICLES

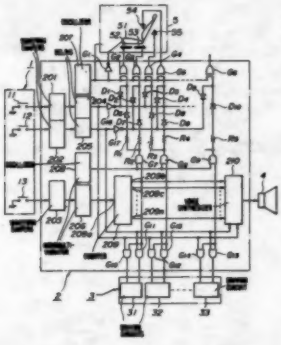
Masatsugu Saito, Yamato; Chikamasa Ikeda, Yokohama; Seiei Takeoka, Yokohama, and Kazuji Katsutani, Yokohama, all of Japan, assignors to Niles Parts Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 399,402, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 256,157, Oct. 11, 1988, abandoned, which is a continuation of Ser. No. 61,039, Jun. 12, 1987, abandoned, which is a continuation of Ser. No. 831,287, Feb. 20, 1986, abandoned. This application Feb. 13, 1990, Ser. No. 480,337

Claims priority, application Japan, Mar. 18, 1985, 60-53994; Oct. 1, 1985, 60-218780

Int. Cl.[5] B60Q 3/00

U.S. Cl. 340—425.5 7 Claims



1. An apparatus for controlling the settings of each of a plurality of degrees of freedom of parts of a vehicle, including parts of a seat of the vehicle for changing the posture of the seat for the comfort of the driver sitting in it, said apparatus comprising

a manually-operated mode select switch for selecting one at a time in a predetermined order by the repeated operation of said mode select switch each of a plurality of control modes of said seat, each said control mode corresponding to a respective one of said degrees of freedom, and a manually-operated increasing/decreasing switch means for selecting an increasing or decreasing of the respective setting of the degree of freedom of the currently selected control mode, said increasing/decreasing switch means being operated identically in each said selected mode for said selective increasing or decreasing of the respective setting,

a control circuit for selecting each said control mode and for changing the setting of each said degree of freedom in accordance with the operation by the driver of said mode select switch and increasing/decreasing switch means, and

display means for visually displaying which of said control mode is currently selected and whether said respective setting for said selected control mode is being increased or decreased, according to respective signals input thereto,

wherein said control circuit comprises means for generating and supplying said signals to said display means representing said currently selected control mode and whether the respective setting is being changed according to said operation of said increasing/decreasing switch means, and

wherein said display means comprises a voice generating means for announcing, after a predetermined delay, which of said control modes was selected by said driver, said voice generating means including

a start input section for receiving a start signal indicating that said announcing of said selected control mode is to begin,

an inhibiting means connected to said start input section for providing said start signal thereto with a delay of a first predetermined period after said selecting by said driver of said selected control mode, for delaying said announcing of each said selected control mode for said predetermined period, wherein if a subsequent control mode is selected by operation of said mode select switch during said first predetermined period the announcement of the previously selected control mode does not occur, and

reset means for resetting said control circuit to an initial condition in accordance with no operation of either said mode select switch or said increasing/decreasing switch means for at least a second predetermined period which is longer than said first predetermined period, said initial condition of said control circuit being such that subsequent operation of said mode select switch by said driver recommences said selection of said control modes in said predetermined order from said initial state.

4,967,179
SADDLE FOR CYCLES, MOTOR CYCLES AND THE LIKE

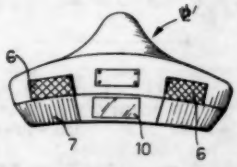
Fabio Solini, Cassola, Italy, assignor to Selle San Marco Di Girardi Comm. Luigi S.p.A., Vicenza, Italy

Filed Apr. 7, 1989, Ser. No. 334,657

Claims priority, application Italy, Apr. 14, 1988, 673248 A/88

Int. Cl.[5] B62J 6/00

U.S. Cl. 340—432 10 Claims



1. A saddle assembly for a vehicle, said vehicle having a source of electrical power, wherein said assembly comprises:

a saddle;

a lamp means attached to the rear of said saddle;

detection means for detecting braking of the vehicle, and

connection means responsive to said detection means for connecting said source to said lamp means whilst the vehicle is braking;

wherein said saddle further comprises at least one transparent plate mounted in the rear surface thereof and said lamp means comprises at least one indicator lamp mounted behind said at least one plate.

4,967,180
PRE-IMPACT ALARM APPARATUS

Hsuq-Fang Wang, 129 Tuan-Chu Lane, Tuan-Cbu Li, Chiayi City, Taiwan

Filed May 15, 1989, Ser. No. 351,475

Int. Cl.[5] B60Q 5/00

U.S. Cl. 340—436 3 Claims

1. A pre-impact alarm apparatus comprising:

a flexible sensing bar having a first end and a second end, said first end having a positioner affixed thereon which is adapted to affix said sensing bar at a position of a car, said second end having a sensing head adapted to impact with an obstacle and generate a signal; and

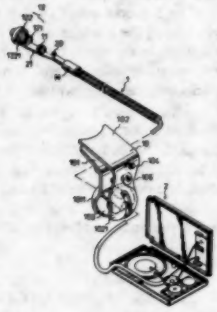
an audio-apparatus electrically connected with said sensing head of said sensing bar, said audio-apparatus being adapted to receive the signal generated by said sensing head and generate an audio-alarm;

said sensing head further comprising:

a conductive bushing sleeved on said sensing bar, at a position near said second end;

an insulating bushing sleeved on a position of said sensing bar, which is nearer said second end than said conductive bushing;

a spiral coil spring having a large coil end and a small coil end, said spiral coil spring being disposed around said



sensing bar, fastening said small coil end on said insulating bushing and extending said large coil end beyond said second end; and

a conductive head affixed with said large coil end of said spiral coil spring, so that when said conductive head impacts with an obstacle, said spiral coil spring is bent to make said conductive head contact with said conductive bushing.

4,967,181

FUEL LEVEL GAUGE PROVIDED WITH AN APPARATUS FOR ISSUING A WARNING ON THE AMOUNT OF REMAINING FUEL

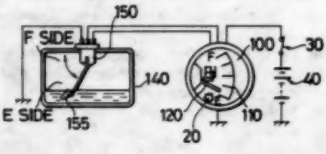
Tsutomu Iizaka, and Tatsuo Ikegaya, both of Shimada, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Sep. 1, 1989, Ser. No. 401,801

Claims priority, application Japan, Sep. 12, 1988, 63-226347; Jun. 21, 1989, 1-156839

Int. Cl.[5] B60Q *1/00*

U.S. Cl. 340—450.2 **12 Claims**



1. A fuel level gauge provided with a remaining-amount warning apparatus, comprising:

means for indicating the amount of fuel remaining in a fuel tank;

a resistor device for operating said indicating means and including a resistance plate having a resistor and a sliding element arranged to slide on said resistor on said resistance plate in accordance with a liquid level change in said fuel tank;

warning means for issuing a warning when said amount of remaining fuel reaches a predetermined amount which requires issuance of the warning,

a diode disposed on said resistance plate to form a remaining-amount warning point on said resistance plate, said remaining-amount warning point being the position on said resistor at which said sliding element is positioned when said amount of remaining fuel reaches said predetermined amount; and

a circuit connecting said resistor device and said warning means for causing said warning means to operate when said sliding element reaches said remaining-amount warning point.

4,967,182

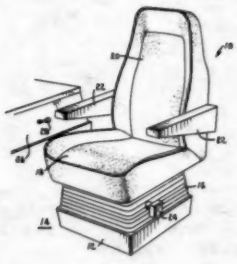
PARKING BRAKE WARNING DEVICE FOR OVER THE ROAD TRACTOR TRAILERS

Bobby D. Foster, 403 N. Delaware, Butler, Mo. 64730

Filed Aug. 28, 1989, Ser. No. 399,788

Int. Cl.[5] B60Q *1/00*

U.S. Cl. 340—457.3 **1 Claim**



1. In an over the road tractor having a battery, an operator's seat mounted on an enclosed expansible and collapsible accordion pedestal containing air which is in an expanded state when the operator's seat is vacant and a compressed state when the operator's seat is occupied, and a parking brake having set and release conditions, the improvement comprising:

pressure sensing switch means for the pedestal for sensing when the air in the pedestal is in the expanded state or when the air in the pedestal is in the compressed state, said pressure sensing switch means including a switch element having a closed electrical condition when said switch means senses the expanded state of the air in said pedestal or an open electrical condition when said switch means senses the compressed state of the air in said pedestal;

parking brake sensing means responsive to the condition of the parking brake, said parking brake sensing means including an electrical switch element having a closed electrical condition when the parking brake is in the release condition thereof and an open electrical condition when the parking brake is in the set condition thereof;

electrically actuated warning means for generating a warning signal when energized; and

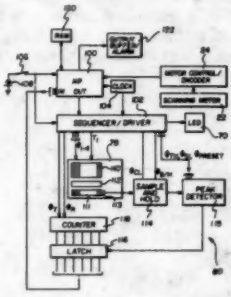
an electrical circuit including the tractor battery and having said warning means and said switch elements of the pressure sensing switch means and the parking brake sensing means arranged in an electrical series relationship therein to energize said warning means whenever both switch elements are simultaneously in the closed condition to complete said circuit.

4,967,183

METHOD OF INTRUSION DETECTION OVER A WIDE AREA

George C. D'Ambrosia, Penfield, and Christopher A. Ludden, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1988, Ser. No. 195,748
The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.
Int. Cl.[5] G08B 13/18
U.S. Cl. 340—552 12 Claims



1. A method of intrusion detection utilizing a detection device which includes a plurality of infrared radiation emitters and a plurality of reflection-receiving means arranged in cooperating pairs, each of said reflection-receiving means having a deflecting means and a plurality of detector means, comprising the steps of projecting a beam of infrared radiation toward a field of view from each emitter whereby at least a portion of each said beam is reflected by the field of view, receiving the reflected radiation of each said beam reflected from said field of view with the cooperating reflection-receiving means and deflecting said received beam onto a specific detector means as determined by the distance from said device at which said beam has been reflected by said field of view, scanning a portion of said field of view with each of said cooperating pairs that is different from the portion of said field of view scanned by the other cooperating pairs, determining by triangulation the distance from said device at which each said beam has been reflected for each of a plurality of azimuthal sectors of said portion of said scanned field of view, generating a plurality of signals indicative of said distances, storing a plurality of reference signals indicative of the distance from said device at which said beam has been reflected by said portion of said field of view in each azimuthal sector during a reference time period, comparing said signals with said reference signals, and generating an output signal if one of said signals is different from the respective reference signal.

4,967,184

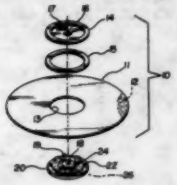
COMPUTER DISK WITH SECURITY PROTECTION

Matthias H. Regelsberger, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 19, 1989, Ser. No. 409,496
Int. Cl.[5] G08B 13/14; G11B 5/82
U.S. Cl. 340—572 12 Claims

1. An improvement in security protection of computer disks of the type having a central aperture, a drive hub located in the aperture, the hub having a circumferential flange overlying the perimeter of the substrate aperture and at least a portion of the hub comprised of a ferromagnetic metal adapted to cooperate with a magnetic disk clamp in a disk drive apparatus, means for securing the disk substrate to the hub flange and a ring-shaped surveillance marker formed around at least a substantial portion of the aperture periphery between the disk substrate and the hub flange, the improvement comprising:

said ferromagnetic hub metal having a coercivity greater than the coercivity of the surveillance marker and less



than the field intensity of the magnetic field employed in the detection zone of a surveillance portal to detect the presence of the surveillance marker as the disk is carried through the portal.

4,967,185

MULTI-DIRECTIONALLY RESPONSIVE, DUAL-STATUS, MAGNETIC ARTICLE SURVEILLANCE MARKER HAVING CONTINUOUS KEEPER

Samuel Montean, Blaine, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 8, 1989, Ser. No. 391,089
Int. Cl.[5] G08B 13/14
U.S. Cl. 340—572 13 Claims

1. A marker for use in an electronic article surveillance system having in an interrogation zone an alternating magnetic field, comprising a substantially planar sheet of high permeability, low coercive force responder material having a width not less than one half the length, having at least two elongated areas proximate to the periphery of the sheet, the length of at least one elongated area being substantially perpendicular to the length of another elongated area, each said area having a narrow width forming a switching section and extending on each end along the length into extensive regions thereby forming flux collector sections for the adjacent switching section, and

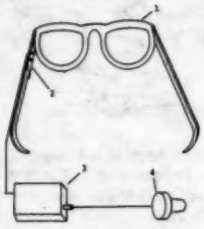
a continuous uninterrupted sheet of remanently magnetizable material having substantially the same overall dimensions as said sheet of responder material, overlying and magnetically coupled to said sheet of responder material, which sheet, when substantially uniformly magnetized in the plane of the sheet causes alternate switching pulses resulting from a reversal of magnetization of said switching sections to be shifted in time and/or altered in amplitude, thereby enabling markers having said magnetizable sheet magnetized or demagnetized to be distinguished from each other.

4,967,186

METHOD AND APPARATUS FOR FATIGUE DETECTION

Ariold Ludmirsky, 46 Hatayasim, Jerusalem 92509, and Arie Zigler, 23 Ostashinsky, Rishon Le Zion, both of Israel

Filed Aug. 18, 1989, Ser. No. 395,466
Int. Cl.[5] G08B *23/00*; A61B *3/14*
U.S. Cl. 340—575 **10 Claims**



1. An apparatus for detecting fatigue, said apparatus comprising:

source means for generating and reflecting an IR light beam off a point of a persons eye;

detector means for receiving the reflected IR light beam and generating a sensed signal in response thereto; and

processing means for comparing the amplitude and duration of said sensed signal generated by said detector means to predetermined amplitude and duration threshold values and generating an alarm signal when said predetermined threshold values are exceeded by said signal, wherein said processing means includes means for varying said alarm signal in accordance with variations in said sensed signal that are indicative of a fatigue level.

4,967,187

METHOD AND APPARATUS FOR PARTICLE CONCENTRATION DETECTION USING A CLOUD CHAMBER

Jerome E. Dumas, Johns Island; Eric W. Harris, Jr., Moncks Corner, and John G. MacDougal, Charleston, all of S.C., assignors to Research Equipment Corporation, North Charleston, S.C.

Filed May 15, 1989, Ser. No. 352,149
Int. Cl.[5] G08B *21/00*, *17/10*
U.S. Cl. 340—628 **20 Claims**

1. An apparatus for sampling a sample of the gaseous medium of a zone or area to determine the concentration, or changes in concentration, of small particles suspended in the gaseous medium of that area or zone comprising:

an elongated cloud chamber having input and output openings for receiving the gaseous medium;

a source of light disposed within said chamber;

an optically photosensitive element disposed in said chamber and spaced-apart from said light source, said element being electronically responsive to varying levels of said light, said light source and photosensitive element being optically aligned with each other;

an input valve coupled to said chamber input opening;

an exhaust valve coupled to said chamber output opening;

a microprocessor for processing data;

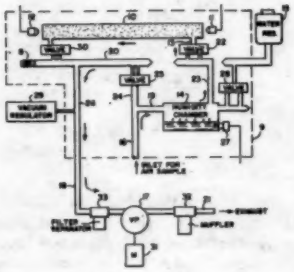
a programmable memory means coupled to said microprocessor, having pre-programmed data on particle concentration levels, for sequencing said microprocessor to operate said valves sequentially to sample the gaseous medium, said memory means being coupled to said exhaust valve for opening said exhaust valve to reduce the gas pressure in said chamber to create a condition of reduced gas pressure therein, and then closing said exhaust valve to retain said condition of reduced gas pressure therein;

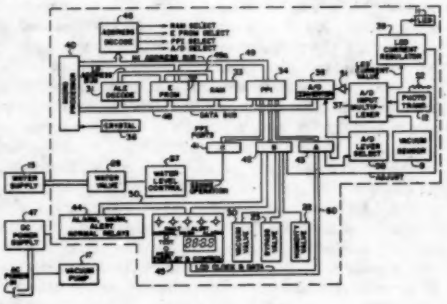
said memory means being coupled to said input valve for actuating said input valve and means for

combining a gaseous substance that becomes cloudy in the presence of the reduced gas pressure in the cloud chamber to form a cloud with the sample of gaseous medium containing small particles so that said particles precipitate or condense a portion of the cloud of said chamber in proportion to the concentration of said particles;

means for measuring the output of said photosensitive element that measures the change in light intensity due to the effect of the concentration of particles on the light level in said chamber, said measuring means being coupled to said memory means for providing a signal proportional to the particle concentration levels in the cloud chamber;

said memory means opening said input and output valves of





said chamber to exhaust the gas and particles in said chamber so that the cycle of particle concentration measurement may be repeated;

data storage means coupled to said memory means for recording for each cycle of operation, each of the particle concentration levels sensed and measured by said measuring means, the levels senses over several cycles of operation, and comparing the sensed and recorded particle concentration levels with the preset threshold levels; and, whereby the speed of the sampling cycle is increased by said programmable memory means when the sensed and recorded particle concentration level exceeds the preset threshold level, in order to detect the increase in particle concentration levels.

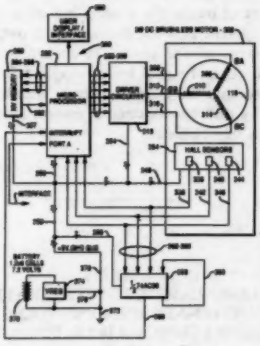
display and control means coupled to said data storage means for providing a signal when the sensed and recorded particle concentration levels exceed the present threshold levels.

4,967,188

METHOD FOR DETECTING LOW BATTERY VOLTAGE IN PORTABLE SCANNING SYSTEMS

Donald A. Collins, Jr., Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Jul. 26, 1989, Ser. No. 387,195
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—636 17 Claims



1. A method of detecting battery voltages in a battery-powered scanning system capable of reading a bar code comprising the steps of:

(a) moving a scanning element by a motor coupled thereto;

(b) producing a laser beam for focus upon and deflection by said scanning element, said laser beam thus being able to scan a bar code;

(c) driving said motor, and outputting signals from sensors coupled to said motor corresponding to scanning element movement;

(d) storing in memory, a value representing the motor speed which corresponds to a minimum battery voltage;

(e) during operation of the scanning system, measuring a motor speed derived from the signals output from said sensors and comparing it to the motor speed corresponding to said minimum battery voltage; and

(f) producing a user perceivable signal indicating unacceptably low battery voltage when said measured motor speed is below the motor speed corresponding to said minimum battery voltage.

4,967,189

CRT DISPLAYING METHOD IN NUMERICAL CONTROL DEVICES

Mutsutaka Sumita, and Takayoshi Kurachi, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 408,966
Claims priority, application Japan, Sep. 22, 1988, 63-237780
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—679 6 Claims

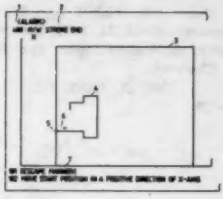
1. A CRT displaying method for use in a numerical control device for controlling a machining apparatus which is provided with a machining tool to machine a workpiece, said displaying method comprising the steps of:

detecting the occurrence of an error condition during an operation of said machining apparatus;

displaying an alarm code number assigned in advance to said error condition, said alarm code number being displayed in an alarm code number area on said CRT;

displaying an alarm message corresponding to said alarm code number in an alarm message displaying area on said CRT;

graphically displaying a manner of how to escape from said error condition which manner is identified based on said



alarm code number and an operational program for said numerical control device; and

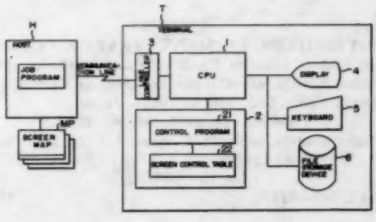
literally displaying said manner.

4,967,190

METHOD OF AND APPARATUS FOR CONTROLLING SCREEN DISPLAY

Kazuhiro Fujisaki, and Hiromi Fujisaki, both of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,655
Claims priority, application Japan, Jul. 10, 1987, 62-172506
Int. Cl.[5] G09G 1/00
U.S. Cl. 340—700 8 Claims



1. A screen display control method in a terminal equipment having a display screen to be connected via a communication line to a host computer comprising the steps of:

(a) providing a file of screen data and a table in which relational data between display screen data, input data to identify screens, and next screen data associated therewith are registered;

(b) when a screen data being currently displayed is beforehand registered as a display screen data in said table, retrieving, in response to inputting of a selected screen indentify data, from said table next screen data registered in association with the display screen data and the input data so as to read the next screen data from said file and displaying the screen data on said display;

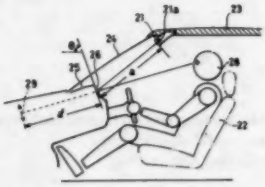
(c) when the screen data being currently displayed is not beforehand registered as display screen data to said table, transmitting, in response to inputting of the selected screen identify data, the input data or data associated therewith to said host computer communicating with said terminal in order to request next screen data or information specifying the next screen data.

4,967,191

DISPLAY APPARATUS FOR AUTOMOTIVE VEHICLE

Tadashi Iino, Susono, Japan, assignor to Yazaki Corporation, Japan

Continuation of Ser. No. 182,193, Apr. 15, 1988, abandoned. This application Jul. 21, 1989, Ser. No. 383,041
Claims priority, application Japan, Apr. 16, 1987, 62-56666; Apr. 23, 1987, 62-60664
Int. Cl.[5] G09G 3/02
U.S. Cl. 340—705 2 Claims



1. A display apparatus for an automotive vehicle, which comprises:

(a) a projector, disposed at a ceiling in a passenger compartment of the automotive vehicle, for projecting display images;

(b) a reflector, disposed in a recess formed in a panel surface of a dashboard of the automotive vehicle, for reflecting the display images projected by said projecting means toward a driver of the automotive vehicle, said reflector being any one of a mirror and a hologram plate being disposed frontwardly inclined so that an upper portion of said reflector is positioned relatively closer to a front end of said vehicle than is a lower portion of said reflector; and

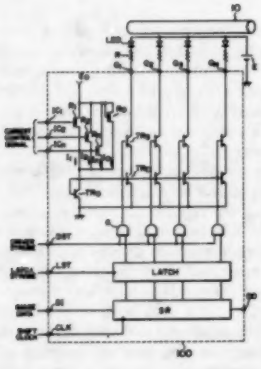
(c) a pivotal shaft, disposed in the recess formed in the panel surface of the dashboard, for pivoting said reflector.

4,967,192

LIGHT-EMITTING ELEMENT ARRAY DRIVER CIRCUIT

Hideo Hirane, Hitachi; Kiyohiko Tanno, Katsuta, and Hisao Iizuka, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 184,025
Claims priority, application Japan, Apr. 22, 1987, 62-97387; May 13, 1987, 62-114699
Int. Cl.[5] G09G 3/00
U.S. Cl. 340—811 41 Claims



1. A light-emitting element driver circuit for driving at least one light-emitting element comprising:

a current mirror circuit including at least one reference element and at least one output element;

a reference current source for outputting a plurality of reference current values, said reference current source being coupled to said current mirror circuit;

select means for specifying and selecting one of said plurality of reference current values to be outputted from said reference current source and applied as an input current to said current mirror circuit; and

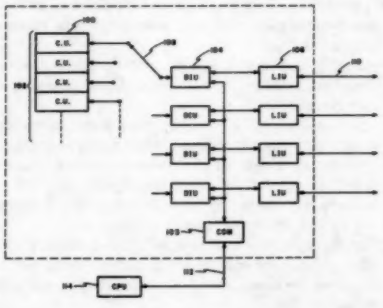
output control means for controlling an on/off state of an output current flowing through said output element of said current mirror circuit in accordance with a light emission control signal being supplied from an external source so that the output current, which is on/off controlled by said output control means, is supplied to said light-emitting element.

4,967,193

DIGITAL LOOP CARRIER SYSTEM HAVING CPU TO CHANNEL UNIT PROTOCOL

Harry J. Dyke, Oak Forest, and Dev R. Rattan, Chicago, both of Ill., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 15, 1988, Ser. No. 244,961
Int. Cl.[5] H04Q 1/00
U.S. Cl. 340—825.030 16 Claims



1. A method of communicating in a telecommunication system having at least a central processing unit (CPU) connected to a plurality of digital interface units (DIU) via a communication module (CM), each of said digital interface units connected to a plurality of channel units (CU), said method comprising the steps of:

sending from said CPU to said CM a command message having at least a first DIU address of a selected DIU of said plurality of DIU's, a channel address of a selected CU of said plurality of CU's, a second DIU address, said second DIU address being substantially identical to said first DIU address, and a first information portion:

checking for errors in said command message by at least said CM;

sending substantially said command message from said CM to said plurality of DIU's, said selected DIU receiving said command message; and

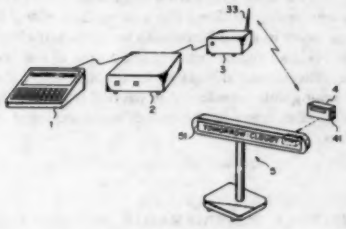
in said selected DIU removing said first DIU address from said command message to form a modified message, and sending said modified message from said selected DIU to said plurality of CU's, said selected CU receiving said modified message.

4,967,194

RADIO MESSAGE DISPLAY SYSTEM

Toshihiro Haruki, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Feb. 3, 1987, Ser. No. 10,404
Claims priority, application Japan, Feb. 5, 1986, 61-24418
Int. Cl.[5] G08B 5/22
U.S. Cl. 340—825.440 12 Claims



1. A radio message display system for displaying a message entered by transmitting the message over a radio link, comprising:

an input device for entering a message;

an encoder for coding an output of said input device;

a paging transmitter for modulating a carrier by an output of said encoder and transmitting said modulated carrier as a radio carrier;

a paging receiver having a receiving and demodulating section for receiving and demodulating the radio carrier to produce said message, a display section for displaying said message on said paging receiver, and an output terminal for outputting said message at the same time as said message is being received; and

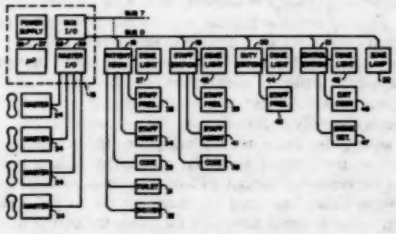
a display panel having an input terminal and a mounting section for mounting said paging receiver, said message being supplied from said output terminal to said input terminal when said paging receiver is mounted in said display panel, and a display for displaying said message from said input terminal.

4,967,195

HOSPITAL SIGNALING AND COMMUNICATIONS SYSTEM

Robert T. Shipley, 6641 Glen Oaks Way, Oakland, Calif. 94611

Filed May 8, 1986, Ser. No. 861,090
Int. Cl.[5] H04Q 1/00
U.S. Cl. 340—825.520 31 Claims



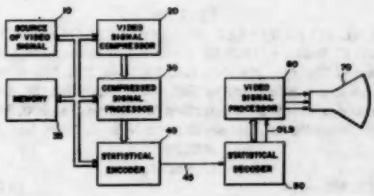
1. In a hospital signaling and communications system: a bus having separate data and twisted pair low frequency audio lines extending about the hospital, a central station including a central audio power amplifier, said central station being connected to the bus for transmitting and receiving data and audio signals over the separate data and audio lines, a plurality of remote stations having unique address codes connected to the bus at different locations within the hospital for transmitting and receiving data and audio signals over the separate data and audio lines whereby amplified audio signals are received at the remote stations and unamplified audio signals are transmitted by the remote stations, a master station connected to the central station for communicating with the remote stations through the central station, means at the central station for transmitting address codes for the remote stations over the data line in a serial sequence, means responsive to the address codes at each of the remote stations for enabling the station whose address code is transmitted to receive and transmit data and audio signals over the separate data and audio lines for a predetermined interval of time by time division multiplexing after the address code is transmitted, a plurality of peripheral devices including a call switch for summoning aid connected to the remote stations, means at the remote stations responsive to data signals from the central station for controlling operation of at least some of the peripheral devices, means at the remote stations for storing data from at least some of the peripheral devices for transmission to the central station, and means operable from the remote stations and in response to signals from the central station for clearing data from the storage means.

4,967,196

APPARATUS FOR DECODING VARIABLE-LENGTH ENCODED DATA

David L. Sprague, Hopewell, and Allen H. Simon, Belle Mead, both of N.J., assignors to Intel Corporation, Santa Clara, Calif.

Filed Mar. 31, 1988, Ser. No. 175,993
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] H03M 7/42
U.S. Cl. 341—67 6 Claims



1. A system for decoding statistically encoded digital data, comprising:

a source of said statistically encoded digital data including a plurality of parameter values each of which describes a set of code words representing respective fixed-length data values;

memory means, coupled to said source for holding said plurality of parameter values; and

decoding means, coupled to said source and to said memory means for arithmetically combining selected ones of said plurality of parameter values with data values extracted from said encoded digital data to generate fixed-length decoded data values.

4,967,197

ERROR CORRECTION SYSTEM FOR DIGITAL TO ANALOG CONVERTERS

Yung-Chow Peng, Hsin-Chu, Taiwan, assignor to Industrial Technology Research Institute, R.O.C., Hsinchu, Taiwan

Filed May 17, 1989, Ser. No. 352,992
Int. Cl.[5] H03M 1/06
U.S. Cl. 341—118 4 Claims

1. A digital to analog conversion system using a medium

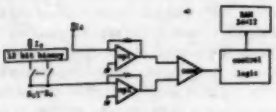
resolution digital to analog converter (DAC) with error correction to obtain high resolution, comprising

a segment DAC controlled by input digital data,

said segment DAC having output current converted into a first voltage through a first operational amplifier,

a quantized reference current source,

said quantized reference current source being converted into a second voltage through a second operational amplifier,



means for comparing each level of said quantized reference current source with corresponding current from said segment DAC to obtain respective error of analog output,

said means for comparing comprising a comparator fed from said first voltage and said second voltage,

means for storing said error in a memory,

means for recalling said error for correction of analog output in normal operation.

4,967,198

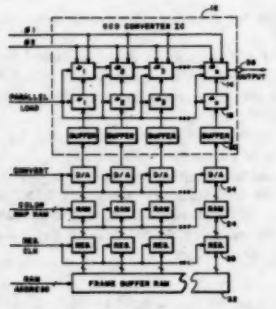
SERIAL-TO-PARALLEL ANALOG CCD GAAS DEVICE

Michael C. Seckora, 6525 St. Louis Rd., Gervais, Oreg. 97026

Division of Ser. No. 206,975, Jun. 13, 1988, Pat. No. 4,906,997, which is a continuation of Ser. No. 77,952, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 733,000, May 13, 1985, abandoned. This application Mar. 1, 1990, Ser. No. 488,207

Int. Cl.[5] H03M *1/00*

U.S. Cl. 341—150 **10 Claims**



1. A digital-to-analog conversion system including a storage device adapted for converting signal formats, comprising:

a plurality of multiple bit digital-to-analog converters having output conductors, the converters operative for concurrently converting digital data into discrete analog data, such that each of the analog data has a magnitude that represents the weighted value of an input digital datum;

a plurality of first storage elements interconnected to form a first linear array having an analog output; and

a plurality of second storage elements arranged in a second linear array, the second storage elements having input conductors each one of which is coupled to a different one of the output conductors of the digital-to-analog converters to hold analog data transferred in parallel from the converters, the first storage elements operative for receiving discrete analog data from the second storage elements and continually shifting the analog data along the first linear array in accordance with sequences of clock pulses to provide an analog signal at the output of the first linear array, the second storage elements operative for holding the analog data transferred in parallel from the digital-to-analog converters at the end of each sequence of clock pulses.

4,967,199

GROUND PROBING RADAR METHOD AND APPARATUS

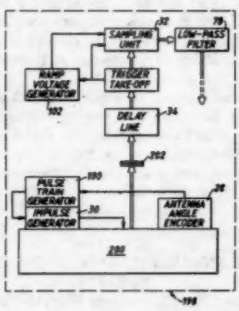
David J. Gunton, Stakeford; Howard F. Scott, Whitley Bay; Michael P. Stansfield, Old Benwell; Paul B. Cordes, Whitley Bay, and Roger P. Ashworth, Forest Hall, all of England, assignors to British Gas plc, London, England

Filed May 26, 1989, Ser. No. 357,532

Claims priority, application United Kingdom, May 27, 1988, 8812705; Apr. 10, 1989, 8908022

Int. Cl.[5] G01S *13/04*

U.S. Cl. 342—22 **6 Claims**



1. Ground probing radar apparatus comprising a support assembly which can be moved over the ground, an antenna assembly comprising transmit and receive elements and mounted on the support assembly so as to be rotatable about an axis directed into the ground, a drive motor mounted on the support assembly and connected to the antenna assembly so as to be able to rotate it about said axis, and means operable in response to rotation of the antenna assembly about said axis to produce data representative of the angular position of the antenna assembly about said axis, the support assembly carrying an impulse generator feeding pulses to the transmit elements of the antenna assembly, a sampling unit, a low-pass filter for receiving the output from the sampling unit, an analogue-to-digital converter for receiving the output from the filter, a digital signal processor receiving the output from the converter, a ramp voltage generator and a pulse train generator, said data being fed to the digital signal processor and to the ramp voltage generator, the output from the pulse train generator being fed to the impulse generator and to the sampling unit, and the sampling unit receiving the output data from the receive elements of the antenna assembly via a delay line and the output from the ramp voltage generator being fed to the sampling unit.

4,967,200

PROCESSOR FOR RADAR SYSTEM

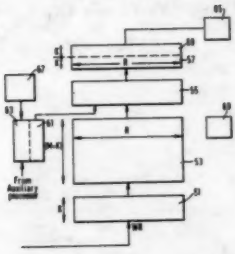
Bernard Arambepola, Essex, United Kingdom, assignor to The General Electric Company, p.l.c., London, United Kingdom

Filed Nov. 10, 1988, Ser. No. 269,732

Claims priority, application United Kingdom, Nov. 11, 1987, 8726390; Feb. 9, 1988, 8802906; Apr. 27, 1988, 8809950

Int. Cl.[5] G01S *13/90, 7/295*

U.S. Cl. 342—25 17 Claims



1. An azimuth processor for a synthetic aperture radar system, comprising a sequence of data storage locations, means for entering range line samples derived from successive radar echo signals into the sequence of data storage locations, the length of the sequence of data storage locations being selected to accommodate a range line, and a two-dimensional array of storage locations functionally arranged as rows and columns and arranged to receive successive range line samples from the data storage locations into rows of the array, wherein the means for entering the range line samples is operative to enter the samples at a variable starting location along the sequence of data storage locations.

4,967,201

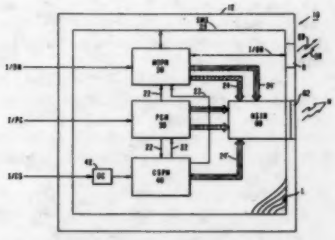
MULTI-LAYER SINGLE SUBSTRATE MICROWAVE TRANSMIT/RECEIVE MODULE

Edward L. Rich, III, Arnold, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 22, 1987, Ser. No. 111,328

Int. Cl.[5] H05K *7/20*

U.S. Cl. 342—175 24 Claims



1. A microwave transmit-receive module comprising:

a single multi-layer substrate including a plurality of integrated dielectric layers, and electrical conductors and thermal conductors selectively interconnected integrally between the layers of the substrate;

a microwave signal processing means including a plurality of integrated components and discrete thick film components mounted on the substrate and interconnected with the electrical and thermal conductors for processing microwave microwave signal;

a control signal processing means including a plurality of integrated components and discrete thick film components mounted on the substrate and interconnected via the electrical conductors with the microwave signal processing means for providing control signals therefor;

a power conditioning means including a plurality of integrated components and discrete thick film components mounted on the substrate and interconnected via the electrical conductors with the microwave signal conditioning means and the control signal conditioning means for providing power thereto; and

a heat sink interface means including a discrete thick film mounted on the substrate and selectively interconnected at least via the thermal conductors with the microwave processing means and the power conditioning means for carrying heat energy away therefrom.

4,967,202

VEHICLE WINDOW GLASS ANTENNA SUITED TO RECEPTION OF FM RADIO AND TV BROADCASTING

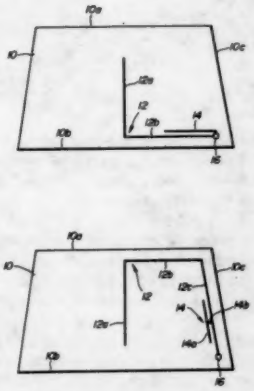
Masao Shinnai; Kazuya Nishikawa; Tokio Tsukada, and Tohru Hirotsu, all of Matsusaka, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Feb. 24, 1989, Ser. No. 315,267

Claims priority, application Japan, Feb. 25, 1988, 63-40723; Apr. 28, 1988, 63-107787

Int. Cl.[5] H01Q *1/320*

U.S. Cl. 343—713 6 Claims



1. An antenna attached to an automobile windshield glass for receiving broadcast waves, the antenna comprising:

a feed point disposed in a lower end part of a side marginal region of the window glass;

a main antenna element which is a conductive strip and comprises a first part, which extends substantially perpendicular to upper and lower edges of the window glass in a widthwise central region of the window glass and has an end at a short distance from the upper edge of the glass, and a second part comprising a horizontal segment which extends from said end of said first part substantially parallel to said upper edge and has an end in said side marginal region of the glass, and a supplementary segment which extends in said side marginal region of the glass from said end of said horizontal segment to said feed point; and

an impedance matching antenna element which is a conductive strip straight and parallel to said supplementary segment of said second part of said main antenna element and is connected to said supplementary segment of said second

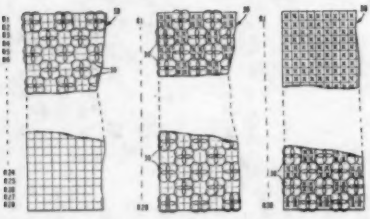
part of said main antenna element within said lower end part of said side marginal region of the glass.

4,967,203

INTERLACE PRINTING PROCESS

Alpha N. Doan, San Diego, and Anthony D. Parkhurst, Oceanside, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 29, 1989, Ser. No. 414,831
Int. Cl.[5] B41J 2/21
U.S. Cl. 346—1.1 16 Claims



1. A process for using an ink-jet printer to produce high quality printed images on a plurality of pixel locations of a printing medium comprising a sequence for depositing an ink on the pixels of the medium, including:

a first pass of a printhead across a first swath of the printing medium wherein alternate of the pixel locations are printed, as required to produce a desired image, such that those of the pixels which are horizontally and vertically adjacent are not printed on said first pass of the printhead, and such that only the alternate pixel locations in a top half of said first swath are printed on said first pass;

a second pass of the printhead across said first swath wherein alternate of the pixel locations are printed, as required to produce a desired image, such that those of the pixel locations to be printed on the top half of said first swath which were not printed on said first pass of said printhead are printed on said second pass of said printhead, and wherein alternate of the pixel locations to be printed in a bottom half of said swath are printed such that those of the pixels which are horizontally and vertically adjacent are not printed on said second pass of said printhead;

a third pass of the printhead across said first swath wherein alternate of the pixel locations are printed, as required to produce a desired image, such that the pixel locations to be printed in said first swath not printed on said first pass of said printhead or said second pass of said printhead are printed on said third pass of said printhead, and wherein a first pass on a next succeeding swath is accomplished simultaneously with said third pass of the printhead across said first swath; and

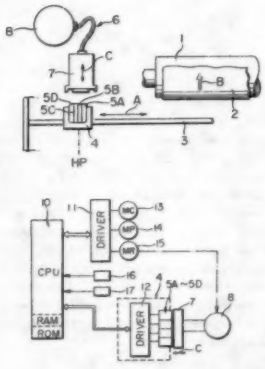
a continuation of passes of said printhead across a plurality of succeeding swaths, repeating the requirements of said first pass, said second pass, and said third pass, until the entirety of said desired image is produced.

4,967,204

METHOD FOR ENSURING STABLE OPERATION OF AN INK JET RECORDING APPARATUS

Koji Terasawa, Mitaka; Hideaki Okamoto, and Hideki Yamaguchi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 246,964, Sep. 21, 1988, abandoned, which is a continuation of Ser. No. 180,674, Apr. 7, 1988, abandoned, which is a continuation of Ser. No. 911,766, Sep. 26, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 323,161
Claims priority, application Japan, Oct. 1, 1985, 60-218252; Oct. 1, 1985, 60-218253
Int. Cl.[5] B41J 2/165
U.S. Cl. 346—1.1 30 Claims



1. A method of operating an ink jet recording apparatus, said apparatus including a recording head for discharging ink through an ink discharge port therein onto a recording medium, a cap for capping the ink discharge port, and sucking means for sucking the ink in the cap, said method comprising the steps of:

determining if a predetermined time period has elapsed during a non-printing operation;

causing the recording head to discharge ink through the discharge port into the cap when the predetermined time period has elapsed during a non-printing operation;

determining if the causing step has been performed a predetermined number of times;

sucking ink collected in the cap when the causing step has been performed a predetermined number of times, by means of the sucking means;

determining if the non-printing operation continues for a second period longer than the predetermined time period; and

removing power from the recording apparatus when the non-printing operating continues for a second period longer than the predetermined time period.

4,967,205

THERMAL HEAD CONTROL DEVICE

Masatoshi Sakaguchi, Gifu, and Yasunori Kitazawa, Anjo, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

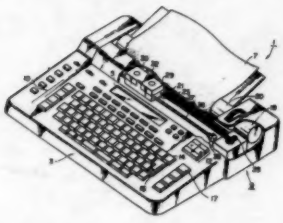
Filed May 30, 1989, Ser. No. 358,879
Claims priority, application Japan, Jun. 6, 1988, 63-138677
Int. Cl.[5] G01D 15/10
U.S. Cl. 346—76 PH 6 Claims

1. A thermal head control device comprising energize means

for energizing a desired number of a plurality of heat elements being provided with a thermal head member, said thermal head control device further comprises:

counter means for counting the number of times of printing operation and spacing operation executed by said thermal head member;

adjustment means for adjusting a period for energizing the heat elements; and



control means for controlling said adjustments means so as to shorten a period for energizing the heat elements by a predetermined differential value until the period becomes a first predetermined value each time the number of printing operations counted by said counter means reaches a predetermined value and for setting the period for energizing the heat elements to a second predetermined value in case the number of the successive spacing operation counted by said counter means reaches another predetermined value.

4,967,206

PRINT STORAGE MEDIUM

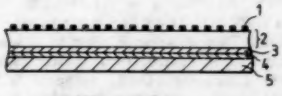
Eiichi Akutsu; Koichi Saitoh; Yoshihiko Fujimura; Nanao Inoue; Kiyoshi Horie; Hiroo Soga, and Hiroshi Fujimagari, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,320

Claims priority, application Japan, Dec. 9, 1987, 62-309667

Int. Cl.[5] G01D *9/00*

U.S. Cl. 346—135.1 **13 Claims**



1. A print storage medium comprising:

a heat generating layer capable of generating heat in response to a current passed therethrough, said current being supplied by a print electrode, said heat generating layer having a first surface and a second surface;

an electrically conductive layer provided on said second surface of said heat generating layer;

an ink release layer provided on said electrically conductive layer;

an ink layer provided on said ink release layer; and

a plurality of microscopic electrodes provided on said first surface of said heat generating layer, said microscopic conductors being electrically isolated from each other and formed of an electrically-conductive resin.

4,967,207

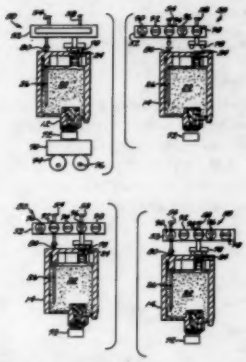
INK JET PRINTER WITH SELF-REGULATING REFILLING SYSTEM

James L. Ruder, Escondido, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 26, 1989, Ser. No. 385,760

Int. Cl.[5] B41J *2/175*

U.S. Cl. 346—140 R **20 Claims**



1. An ink jet printer, comprising:

print head means for ejecting droplets of a colorant, including

a reservoir container that holds a volume of the colorant,

a colorant ejector in communication with the reservoir container that receives a flow of colorant from the reservoir container and ejects droplets of colorant therefrom under command,

a vaccum port in the wall of the reservoir container, and

refill tube means for refilling the reservoir, the refill tube means communicating from the exterior of the reservoir container into the interior of the reservoir container; and

a service station for adding colorant to the reservoir container, including

a colorant supply,

a vacuum manifold,

valve means for controllably placing the vacuum manifold in communication with the vacuum port and sealing the colorant supply from the refill tube means in a first refilling position, and for controllably sealing the vacuum manifold from communication with the vacuum port and placing the colorant supply in communication with the refill tube means in a second refilling position, and

support means for holding the reservoir container in contact with the valve means, for preventing ejection of colorant, and for preventing introduction of air into the print head.

4,967,208

OFFSET NOZZLE DROPLET FORMATION

Winthrop D. Childers, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

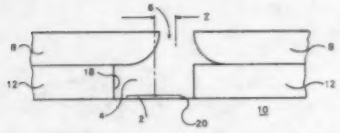
Continuation of Ser. No. 83,761, Aug. 10, 1987, abandoned. This application Mar. 21, 1989, Ser. No. 326,397

Int. Cl.[5] B41J *2/05, 2/145*

U.S. Cl. 346—140 R **2 Claims**

1. An ink jet printhead for ejecting ink in droplet form, including an ink channel for directing a flow of ink and orifice means having at least one nozzle superposing said ink channel, the improvement for ejecting droplets of said ink from said one nozzle of substantially repeatable ink droplet volume, comprising:

only one heating element for said one nozzle, said one heating element having a width less than the width of said ink channel and is substantially centrally located widthwise in said ink channel; and



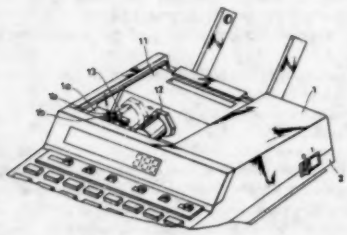
said one nozzle in said orifice means having a centerpoint which is offset from the centerline of said heating element a distance within the range of about 31% to about 78% of one-half of the width of said heating element, in a direction substantially perpendicular to the direction of flow of said ink in said ink channel.

4,967,209

RECOVERY DEVICE FOR AN INK JET PRINTER

Takeshi Hasegawa, Yokohama, and Akihiko Kobayashi, Mitaka, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 29, 1988, Ser. No. 187,987
Claims priority, application Japan, May 6, 1987, 62-108884
Int. Cl.[5] B41J *2/165*
U.S. Cl. 346—140 R **7 Claims**



1. An ink jet printer having a printer body, the printer comprising:

a mounting section for detachably mounting to the printer an ink jet recording head having an ink chamber with a deformable bladder for storing ink to be supplied to a discharge port for discharging ink therethrough;

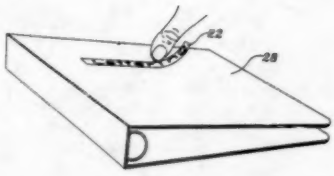
recovery means on said printer body, said recovery means including a receiving surface and a pressing member for pressing said ink chamber, said pressing member being movable between (i) a recovery position in which said pressing member extends from said receiving surface in an orientation wherein said pressing member can be used to press said ink chamber and eject ink from said discharge port to perform a discharge recovery operation and (ii) a retracted position in which said pressing member is received by said receiving surface when not performing said discharge recovery operation, wherein said recovery means has a groove for containing said pressing member therein, and said groove is defined by a cradle of said ink jet recording head and restraining pawls connected to said cradle for restraining a portion of said pressing member.

4,967,210

DRY TRANSFER LETTERING SYSTEM AND METHOD

Allen L. Frazier, Derby, Kans., assignor to DP Tek, Inc., Wichita, Kans.

Filed Sep. 22, 1989, Ser. No. 411,303
Int. Cl.[5] G01D *15/00*; B41J *29/367*
U.S. Cl. 346—150 **12 Claims**
MICROFICHE APPENDIX INCLUDED
(351 Microfiche, 4 Pages)



10. A kit for creating an image and for applying the same to an image-bearing surface, said kit being useable with a programmable computer having an electrostatic printing means operably coupled thereto, said computer having means operably coupled thereto, said computer having means for receiving and storing and operating program, and input means for receiving a selected input, said printing means being operable for receiving a substrate to be printed and for depositing image-defining material on the substrate, said kit comprising:

a substrate presenting a release surface;

computer program storage means having an operating program stored thereon for said computer in order to operate said computer for (1) receiving input representative of a desired image, (2) selectively altering characteristics of the desired image, and (3) operating said printing means to deposit image-defining material on said release surface in accordance with said input as selectively altered, so as to create a final image on said substrate; and

an image-removing adherent web which is substantially transparent when applied to said surface and which includes adhesive on one face thereof for adhesively securing and temporarily fixing the web onto said release surface, said adhesive serving to lift image-defining material from said release surface,

said release surface being characterized by the property of having a lesser affinity for said image-defining material than said web.

4,967,211

PRINTING MACHINE WITH TONER DENSITY BALANCE IN SOLID AREAS AND LINE STROKES

Ralph S. Colby, Tucson, Ariz.; William M. Doumas, Boulder, Colo.; Jean-Claude Fouere, Tucson, Ariz., and Robert M. Rectenwald, Carmichael, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 14, 1988, Ser. No. 206,402
Int. Cl.[5] G01D *15/14*; H04N *1/23*
U.S. Cl. 346—160 **15 Claims**

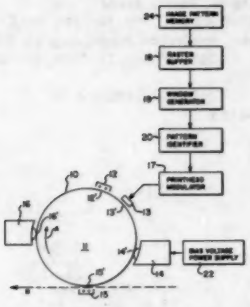
1. A printing machine including image receiving material, imaging means, and a developer means containing toner material, said imaging means operated to produce a latent image on said image receiving material in accordance with image pattern data, said machine comprising:

said image receiving material mounted for movement,

imaging means for producing a charge pattern on the surface of said image receiving material in accordance with image pattern data,

developer means located adjacent said image receiving material for depositing said toner on said material to produce a visually perceptible image,

means for identifying image pattern data representing picture elements (pels) for the interior of solid areas, and



control means for regulating said imaging means to establish the magnitude of development vectors when developing solid area pels at a level different from the magnitude used for developing non-solid area pels.

4,967,212

IMAGE RECORDER

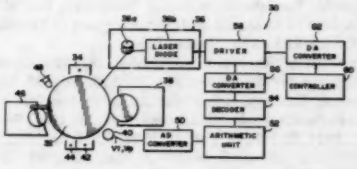
Yoshiharu Manabe; Junko Tomita, both of Kawasaki, and Atsushi Shinozaki, Chiba, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,306

Claims priority, application Japan, Sep. 30, 1988, 63-246695

Int. Cl.[5] G01D *15/06*

U.S. Cl. 346—160 **8 Claims**



4. An image recorder for causing charging means to uniformly choose a photoconductive element, causing exposing means to render optical data representative of an image on the charged photoconductive element in the form of a latent image and to render optical data representative of a reference pattern on the charged photoconductive element in the form of a latent image, and causing developing means to develop said latent images, said image recorder comprising:

line width sensing means for sensing a line width of the developing visible image of the reference pattern; and

correcting means for correcting operating conditions of the recorder by causing the line width of the visible image of the reference pattern sensed by said line width sensing means into coincidence with a predetermined reference line width.

4,967,213

FILM ADVANCING AND REWINDING DEVICE FOR A CAMERA

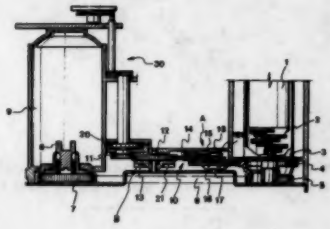
Seong-sook Han, Changwon, Rep. of Korea, assignor to Samsung Aerospace Industries, Ltd., Rep. of Korea

Filed Feb. 9, 1989, Ser. No. 307,961

Claims priority, application Rep. of Korea, Feb. 11, 1988, 88-1626

Int. Cl.[5] G03B *1/12*

U.S. Cl. 354—173.1 **5 Claims**



1. A film advancing and rewinding device for a camera comprising:

a film take-up spool;

a reversible motor and reduction gears engaging the motor, the motor and gears being disposed within the spool for rotating the spool;

a rotatable geared rewinding fork for engaging a film magazine for rewinding film into the magazine;

a toothed endless belt engaging the reduction gears and the rewinding fork;

a rotatable sprocket for engaging perforations of film extending from the film magazine to the spool;

a group of gears for transmitting rotational force from rotation of the spool to the sprocket;

rotational force disconnecting means, located in the group of gears for disconnecting rotational force applied by the rotation of the spool to the sprocket when the film is rewound into the magazine and when the rotational speed of the sprocket driven by movement of the film is faster than the rotational speed of the sprocket as driven by the group of gears; and

film advancing and shutter cocking means for advancing a fixed length of film and cocking a shutter.

4,967,214

CAMERA ON WHICH A FRONT CONVERTER CAN BE MOUNTED

Nobuyuki Taniguchi, Hyogo; Takeo Hoda, Osaka; Yoshiki Hata, Hyogo; Yoshinobu Kudo, Osaka; Manabu Inoue, Hyogo, and Hiroshi Ueda, Aichi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 139,854, Dec. 30, 1987, abandoned, which is a division of Ser. No. 56,688, Jun. 2, 1987, abandoned. This application Sep. 19, 1989, Ser. No. 409,997

Claims priority, application Japan, Jun. 4, 1986, 61-129510

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.[5] G03B *17/48*

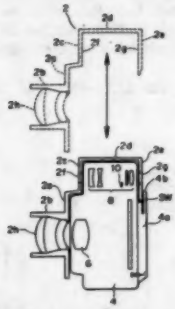
U.S. Cl. 354—79 **7 Claims**

1. A camera on which a front converter can be mounted, comprising:

judging means for judging whether or not a front converter is mounted on said camera;

means for changing an effective focal length accomplished by a taking lens of said camera in response to a manual operation; and

controlling means operable when said judging means judges that a front converter is mounted on said camera for



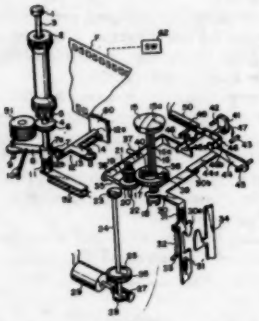
operating said changing means to establish said effective focal length of said taking lens at a long focal length.

4,967,215

AUTOMATIC FILM REWINDING APPARATUS IN A CAMERA

Yasuaki Ishiguro, Fujimi, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 400,273
Claims priority, application Japan, Sep. 1, 1988, 63-216221
Int. Cl.[5] G03B 1/18
U.S. Cl. 354—173.1 4 Claims



1. A camera including a film winding mechanism having a sprocket for winding film from a spool shaft of a film cartridge, a back lid that is opened to load and unload said film cartridge and that is held closed by a releasable restraining mechanism, and drive means having a coupling adapted to be engaged with the spool shaft for rewinding film thereon, and comprising:

first operating means operable from an initial position to an operating position to render said sprocket free from said film winding mechanism;

second operating means operable from an initial position to an operating position to activate said drive means;

a member operable to disengage said coupling from said spool shaft and to release the holding of said back lid by said restraining mechanism;

means for returning said first operating member to its initial position in association with the release of the holding of said back lid by said restraining mechanism; and

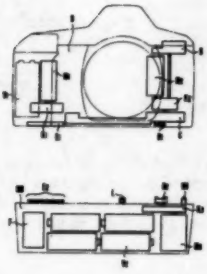
means for returning said second operating member to its initial position in response to the operation of said member.

4,967,216

CAMERA SYSTEM

Tetsuya Nishio, Tokyo; Masayoshi Kiuchi, Kanagawa, and Tsunemasa Ohara, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,529
Claims priority, application Japan, Aug. 16, 1988, 63-203572; Aug. 16, 1988, 63-203573; Aug. 16, 1988, 63-203574; Aug. 16, 1988, 63-203575
Int. Cl.[5] G03B 1/18
U.S. Cl. 354—173.1 19 Claims



1. A camera body adapted to detachably mount a motor drive device thereon, comprising:

(a) a first motor;

(b) a second motor;

(c) a film feeding transmission system arranged to be driven by said first motor serving as a drive source;

(d) a charging transmission system arranged to be driven by said second motor serving as a drive source;

(e) detection means for detecting the mounting of said motor drive device on said camera body; and

(f) a motor-voltage control circuit for increasing a voltage applied to said first motor when said detection means has detected the mounting of said motor drive device.

4,967,217

CAMERA SYSTEM

Kouji Yamamoto, Sakai; Shinji Tominaga, Minamikawachi; Akira Yamanaka, Sakai; Hiroshi Ueda, Nara; Nobuyuki Taniguchi, Tondabayashi; Ikushi Nakamura, and Michihiro Iwata, both of Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 170,237, Mar. 18, 1988, abandoned, which is a division of Ser. No. 797,510, Nov. 13, 1985, abandoned. This application Mar. 20, 1989, Ser. No. 325,111
Claims priority, application Japan, Nov. 14, 1984, 59-173261; Dec. 28, 1984, 59-197143; Feb. 27, 1985, 60-28848; Mar. 8, 1985, 60-33950; Mar. 12, 1985, 60-35962; Mar. 12, 1985, 60-35963; Mar. 27, 1985, 60-45490; Mar. 27, 1985, 60-45491; Mar. 28, 1985, 60-46676; Mar. 28, 1985, 60-46677; Mar. 28, 1985, 60-46678
Int. Cl.[5] G03B 1/00
U.S. Cl. 354—173.11 1 Claim

1. A film rewinding device for use in a camera which comprises:

means for detecting whether or not the load of the film during winding exceeds a given value and for outputting a first film rewinding signal when the load of the film during winding exceeds the given value,

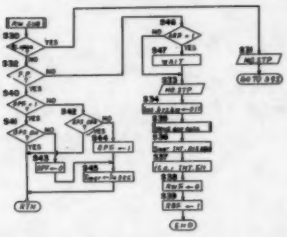
means for outputting a second film rewinding signal by a manual operation,

means for effecting a film rewinding according to the first or second film rewinding signals,

means for detecting the presence or absence of the photo-

graphic film in the passageway of the film path in the camera,

memory means for storing the fact by which signal of the first or second film rewinding signal the film rewinding is performed,



means for stopping the film rewinding in response to the detection of the absence of the photographic film; and

means for delaying said stopping means from stopping the film rewinding for a predetermined period of time when the memory means stores the fact that the film rewinding is being performed by the first film rewinding signal.

4,967,218

LENS DRIVING MOTOR CONTROL APPARATUS

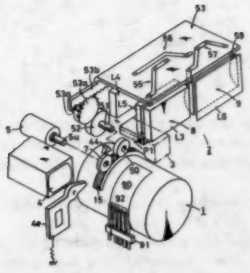
Norio Numako, and Takeo Kobayashi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 302,200, Jan. 27, 1989, abandoned. This application Nov. 24, 1989, Ser. No. 442,433

Claims priority, application Japan, Feb. 3, 1988, 63-23548

Int. Cl.[5] G03B *3/10*

U.S. Cl. 354—195.1 26 Claims



1. A lens driving motor control apparatus comprising a lens barrel which moves a photographing lens system in an optical axis direction, a lens driving motor for driving the lens barrel, means for coding the position of the lens barrel, means for reading a code signal of the coding means, a position controlling means for controlling the lens driving motor to control a position of the lens barrel in accordance with the code signal which is read by the code reading means, and an abnormal code processing means for controlling the position control means, so that when the code read by the code reading means is abnormal, the code signal is treated as not having been read.

4,967,219

CAMERA WITH ZOOM LENS

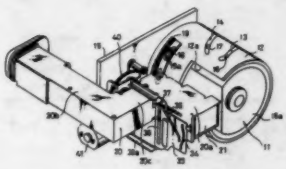
Tahei Morisawa, and Makoto Mogamiya, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 416,986

Claims priority, application Japan, Oct. 4, 1988, 63-130184[U]

Int. Cl.[5] G03B *3/00*

U.S. Cl. 354—199 7 Claims



1. A zoom lens camera comprising a zoom-photographing optical system; and a finder optical unit disposed separately from said zoom-photographing optical system;

wherein movement of said zoom-photographing optical system for zooming is effected by rotating a cam ring about the optical axis as a rotational center; and

a cut-away portion formed in a peripheral surface on a forward portion of said cam ring, a forward portion of said finder optical unit being located in the cut-away portion.

4,967,220

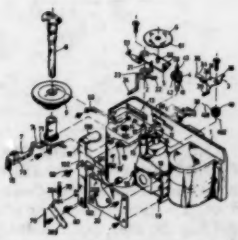
MULTIPLE EXPOSURE STRUCTURE FOR A TWIN LENS CAMERA

Chin-Tien Ho, 1 Fl. No. 270, San Min Rd., Lu Chou Hsiang, Taipei Hsien, Taiwan

Filed Nov. 9, 1987, Ser. No. 120,697

Int. Cl.[5] G03B *17/42*

U.S. Cl. 354—204 3 Claims



1. A non-reflex camera having a winder coupled to a shutter release mechanism including a shutter release member so as normally to prevent the camera shutter from being operated unless the film has been wound after the previous exposure, said mechanism normally being cocked by operating said winder and released by operating said shutter release member comprising: manually operable means arranged to cooperate with the shutter release mechanism for enabling at least two exposures to be made without operating said winder, said manually operable means being arranged to re-cock the shutter release mechanism to enable a further exposure to be made, without operating said winder, by operating said shutter release member.

4,967,221

PHOTOGRAPHIC PROCESSING CASSETTE

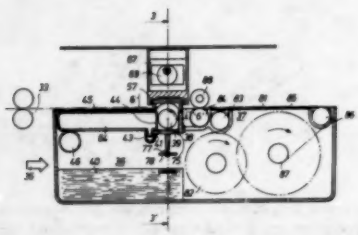
Josef P. De Prijcker, Hamme; Jan A. Zwijsen, Wilrijk; Albrecht F. Domen, Borsem, and Gino L. De Rycke, Mortsel, all of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium

Filed Apr. 4, 1989, Ser. No. 333,020

Claims priority, application European Pat. Off., Apr. 26, 1988, 88200792

Int. Cl.[5] G03D *5/06*

U.S. Cl. 354—318 13 Claims



1. A photographic processing cassette for the processing of an imagewise exposed photographic silver halide emulsion layer element comprising:

developer liquid container means including an initially empty developing tray (38, 106) arranged for co-operation with lick roller means (39, 93) for the application of developer liquid to the photographic element, and a separate holder (64, 107) for a supply of developer liquid and means (44, 103) through which a fluid connection between the holder and the tray may be established,

a normally closed openable draining opening (75, 110) in the developer liquid container means for draining said liquid from said container means when opened, and liquid absorption means (40) located for receiving the liquid draining from the opened draining opening.

4,967,222

METHOD OF AND MACHINES FOR TREATING WEBS OF PHOTOGRAPHIC MATERIAL

Wilhelm Nitsch, Munich, Fed. Rep. of Germany, assignor to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany

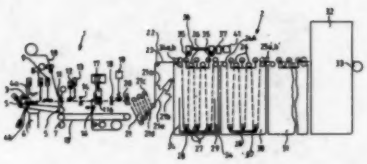
Filed Sep. 29, 1989, Ser. No. 414,947

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833733

Int. Cl.[5] G03D *3/13*

U.S. Cl. 354—321 29 Claims

1. A method of advancing a running web of photographic material in a predetermined direction along an elongated path having a first portion extending through a first machine from which successive increments of the web are discharged, at least at times, at different speeds and a second portion extending through a developing machine in at least one part of which each increment of the web should undergo treatment for a predetermined interval of time, comprising the steps of monitoring the speed of the web at the upstream end of the second portion of said path; and varying the speed of the web at the downstream end of the second portion of said path in response to detected changes of the speed of the web at the upstream



end so that each increment of the web remains in the second portion of said path for said predetermined interval of time.

4,967,223

DISTANCE MEASURING DEVICE

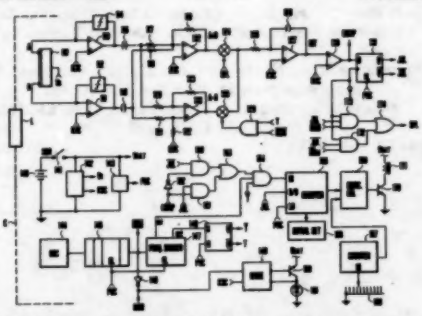
Ryoichi Suzuki, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 11, 1985, Ser. No. 754,349

Claims priority, application Japan, Jul. 11, 1984, 59-143971; Oct. 11, 1984, 59-213122

Int. Cl.[5] G03B *13/36*

U.S. Cl. 354—402 56 Claims



1. A distance measuring device for measuring a distance to an object in accordance with a position where a signal, projected by the device and reflected by the object, is received, comprising:

(A) signal projecting means for projecting a signal to the object;

(b) signal receiving means for receiving the signal reflected from the object and producing two outputs which vary with the position where the reflected signal is received thereon;

(c) first integrating means for integrating one of the difference between the two outputs of the signal receiving means and the amount corresponding to the difference, and second integrating means for integrating one of the sum of the two outputs and the amount corresponding to the sum; and

(D) computing means for computing the ratio of an integration time required by said first integrating means when integrating one of the difference between the two outputs of the signal receiving means and the amount correspond-

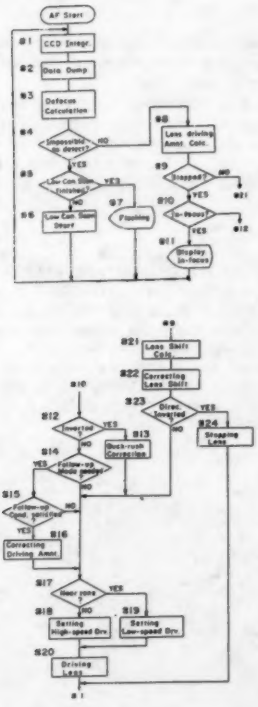
ing to the difference, to an integration time required by said second integrating means when integrating one of the sum of the two outputs and the amount corresponding to the sum over the same integration amount, and for detecting the position where the reflected signal is received by the signal receiving means on the basis of the ratio.

4,967,224

AUTOMATIC FOCUSING DEVICE

Masataka Hamada, Osaka, and Tokuji Ishida, Daito, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 83,819, Aug. 10, 1987, Pat. No. 4,860,045, which is a continuation of Ser. No. 936,103, Nov. 28, 1986, abandoned. This application Feb. 9, 1989, Ser. No. 308,412
Claims priority, application Japan, Nov. 27, 1985, 60-268015; Dec. 13, 1985, 60-280788; Dec. 13, 1985, 60-280789
Int. Cl.[5] G03B *13/36*; G02B *7/28*
U.S. Cl. 354—402 9 Claims



1. An automatic focusing device for a camera having a focus adjustable objective lens for forming an image of an object, comprising:

focus detection means for repeatedly detecting the defocus amount of the image formed by an optical lens to generate a defocus signal corresponding to the detected defocus amount upon each detecting operation;

object movement detection means for detecting movement of the object based on the defocus signals generated by the focus detection means to generate a movement signal corresponding to the amount of movement of the object;

drive means for driving the objective lens for focus adjustment;

correction means for generating a corrected defocus signal based on the movement signal regarding the object, and

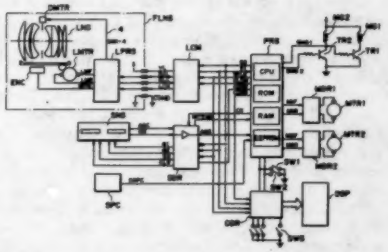
drive control means for causing the drive means to drive the objective lens in accordance with the corrected defocus signal, the corrected defocus signal corresponding to a defocus amount of the image from a predetermined focal plane at an initiation of an exposure operation of the camera.

4,967,225

CAMERA INCORPORATING AUTOMATIC FOCUSING APPARATUS

Akira Akashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 138,155, Dec. 28, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,937
Claims priority, application Japan, Jan. 12, 1987, 62-4577; Jan. 12, 1987, 62-4581; Jan. 12, 1987, 62-4582
Int. Cl.[5] G03B *13/36*
U.S. Cl. 354—402 11 Claims



1. A camera incorporating an automatic focusing apparatus, comprising:

(a) a focus detecting circuit for outputting a focusing signal representing a focusing state of a focusing optical system;

(b) a driving circuit for driving said focusing optical system to an in-focus position in accordance with a focusing signal from said focus detecting circuit;

(c) judging means for judging whether focus detecting is impossible;

(d) a search control circuit for, when said judging means judges that focus detecting is impossible, transmitting a searching signal instead of the focusing signal to said driving circuit in accordance with a judgement signal output from said judging means, said driving circuit driving said focusing optical system within a predetermined range in accordance with the searching signal, and said search control circuit transmitting the focusing signal to said driving circuit when said judging means judges that focus detecting becomes possible during a drive control operation of said focusing optical system performed in accordance with the searching signal, thereby restoring a focusing optical system driving state based on the focusing signal; and

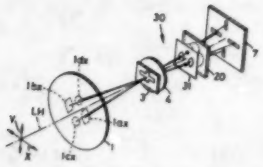
(e) inhibiting means for inhibiting driving of said focusing optical system controlled by said search control circuit after said focus detecting circuit outputs the focusing signal representing an in-focus state.

4,967,226

RE-IMAGING LENS FOR FOCUS STATE DETECTING DEVICE

Chiyuki Kuwata, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,841
Claims priority, application Japan, Mar. 31, 1988, 63-79562
Int. Cl.[5] G03B *3/00, 13/18*
U.S. Cl. 354—406 **8 Claims**



1. A focus state detecting device for use in a camera, comprising:

(a) first two light-receiving units arranged, on a predetermined plane substantially perpendicular to the optical axis of a photographing lens, across the optical axis thereof and along a first direction;

(b) second two light-receiving units arranged, on said predetermined plane, across said optical axis of the photographing lens and along a second direction crossing said first direction; and

(c) a re-imaging optical system provided with first and second lens elements for re-imaging rays of light coming from an object through said photographing lens on said first two light-receiving units, and third and fourth lens elements for re-imaging rays of light coming from said object through said photographing lens on said second two light-receiving units, wherein said first, second, third and fourth lens elements are formed integrally; said first and second lens elements have mutually the same curved surface structures which mutually abut at a boundary line, while said third and fourth lens elements have mutually the same curved surface structures which do not mutually abut, and the curved surface of said third lens element abuts that of said first lens element at a boundary line and abuts that of said second lens element at a boundary line, while the curved surface of said fourth lens element abuts that of said first lens element at a boundary line and abuts that of said second lens element at a boundary line.

4,967,227

COLOR IMAGE RECORDING APPARATUS WITH MASK MEMBER REGISTERING MECHANISM

Makoto Suzuki; Toshio Sakai; Tomoaki Hattori, all of Nagoya, and Izumi Takagi, Kuwana, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

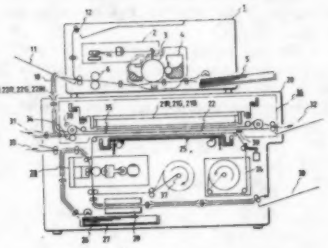
Filed Sep. 11, 1989, Ser. No. 405,434
Claims priority, application Japan, Sep. 9, 1988, 63-226783; Sep. 28, 1988, 63-243234; Sep. 28, 1988, 63-243235; Sep. 28, 1988, 63-243236; Oct. 4, 1988, 63-248976; Oct. 6, 1988, 63-252262; Oct. 18, 1988, 63-262436; Oct. 21, 1988, 63-265637
Int. Cl.[5] G03B *27/32, 27/52*
U.S. Cl. 355—32 **18 Claims**

1. A color image recording device for forming a mask member having a positioning mark thereon on the basis of an input color image and exposing a photosensitive medium through the mask member to light to form a color image on the photosensitive medium comprising:

belt means for carrying the mask member thereon;

belt moving means for supporting and moving said belt means, said belt moving means mounted in said color image recording device so as to be movable relative to said color image recording device;

driving means for driving said belt moving means so that said belt means is movable in a feeding direction of the mask member and in a vertical direction to the feeding direction, said driving means comprising first motor means for registering the mask member in the feeding direction and second motor means for registering the mask member in the vertical direction to the feeding direction and correcting the inclination of the mask member to the feeding direction;



position detecting means for detecting the positioning mark and outputting a signal representing the position of the mask member; and

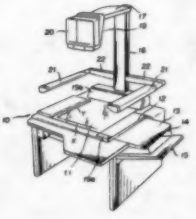
control means for controlling said driving means to change a feeding speed of said belt moving means at two or more states in accordance with the signal from said position detecting means, so that the mask member is roughly fed at a high speed and is finely registered at a low speed.

4,967,228

METHOD OF PHOTOGRAPHING ON MICROFILM AND APPARATUS THEREFOR

Kenjiro Ishii; Fumio Fukumoto; Koichi Nagata, all of Osaka, and Akira Shibata, Tokyo, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 6, 1989, Ser. No. 334,906
Claims priority, application Japan, Apr. 6, 1988, 63-83095
Int. Cl.[5] G03B *27/52*
U.S. Cl. 355—40 **13 Claims**



1. A micro-image photographing camera for photographing original images and additional information on a film, which comprises:

photographing means for photographing an original image on the film;

additional image generating means including a light source and optical means for projecting light from said light source on the film;

transporting means for transporting the film; and

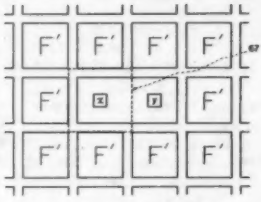
control means for controlling the operating period of said optical means during the transportation of the film by the transporting means thereby allowing the formation of the additional information of a varying size on the film.

4,967,229

PROCESS FOR FORMING DICING LINES ON WAFER

Satoshi Akutagawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 5, 1989, Ser. No. 333,414
Claims priority, application Japan, Apr. 12, 1988, 63-88215
Int. Cl.[5] G03B 27/42
U.S. Cl. 355—53 3 Claims



1. A process for forming dicing lines on a wafer, which comprises:

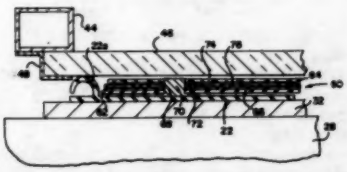
exposing a wafer region, in which a dicing line pattern has not been formed, to light irradiated through and patterned by a reticle for forming dicing lines, said reticle having a nonpatterned region of the same size as a device pattern region of a separate reticle for forming a device pattern on the wafer and a dicing zone in contact with a periphery of the nonpatterned region.

4,967,230

REGISTRATION SYSTEM FOR LIGHT EXPOSURE APPARATUS

G. B. Kirby Meacham, Shaker Heights, Ohio, assignor to nuArc Company, Inc., Niles, Ill.

Filed Sep. 19, 1989, Ser. No. 407,809
Int. Cl.[5] G03B 27/02
U.S. Cl. 355—91 28 Claims



1. Apparatus for exposing a photo-sensitive sheet to light through portions of an image forming film sheet to reproduce said image on said sensitive sheet, comprising:

a support board having a flat upper surface for supporting said photo-sensitive sheet and said film sheet in overlying relation thereon and having a bottom surface, said support board having an upper layer formed of resilient material and having at least one opening extending between said surfaces for receiving a registration pin; and

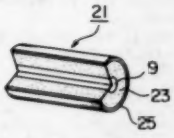
a registration pin, mounted in said opening of said board, having stop means adjacent a lower portion for limiting relative longitudinal movement of said pin in one direction in said opening and having an upper portion normally projecting above said upper surface of said board to extend through aligned registration openings formed in said photo-sensitive sheet and said film sheet for mounting said sheets in precise registration on said upper surface of said board, said upper portion of said pin having a transverse dimension slightly greater than an aligned transverse dimension across said opening in said board for retaining said pin in said board by compression of said resilient material around said opening against said upper portion of said pin.

4,967,231

APPARATUS FOR FORMING AN ELECTROPHOTOGRAPHIC LATENT IMAGE

Masahiro Hosoya, Yokohama; Shuitsu Sato, Kawasaki; Mitsunaga Saito, Tokyo; Tsutomu Uehara, Yokosuka; Mitsuharu Endo, Susono, and Yukio Futamata, Tagata, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa and Electric Co., Ltd., Tokyo, both of, Japan

Filed Dec. 27, 1988, Ser. No. 290,538
Claims priority, application Japan, Dec. 29, 1987, 62-336159; Jan. 27, 1988, 63-016747
Int. Cl.[5] G03G 15/02, 15/06, 15/14, 21/00
U.S. Cl. 355—219 54 Claims



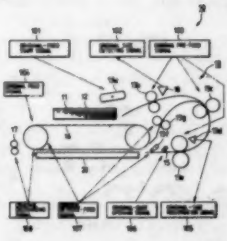
22. A charging device incorporating therein an elastic electroconductive roller provided with an elastic roller base and a flexible conductive layer superposed on a periphery of said roller base, said conductive layer being formed of polyurethane resin and possessing a magnitude of resistance of no more than $10^{12}\Omega$. cm, said conductive layer directly contacting a latent image retaining layer.

4,967,232

COPYING APPARATUS WITH CONVEYER FOR CONVEYING ORIGINALS TO PREDETERMINED COPYING POSITION

Tsuneo Obara, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Sep. 12, 1988, Ser. No. 242,991
Int. Cl.[5] G03G 15/28
U.S. Cl. 355—233 7 Claims



1. A copying apparatus for copying a first and second original document, said apparatus comprising:

detecting means for detecting a size of an original document detected;

a glass copying surface having a plurality of predetermined copying positions;

position selection means for selecting one predetermined copying position on the glass copying surface in accordance with size of an original document detected by said detecting means;

conveying means for feeding predetermined copying position at a first time, and conveying the first original document a predetermined distance past the selected predetermined copying position at a second time, while feeding the second original document to the selected predetermined copy position, said predetermined distance

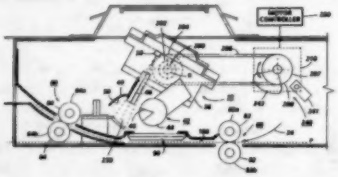
corresponding to the size of the first original document;
copying means for selectively performing full-scanning, half-scanning, and multiple scanning by transferring an image of the original document at the selected predetermined copying position onto a photographic element;
control means for setting a scanning region of the copying means corresponding to the selected predetermined copying position and driving said copying means in said scanning region; and
discharge assist means for removing the first original document from the glass copying surface at times when the predetermined distance is insufficient for the first original document to clear the glass copying surface.

4,967,233

FIXED FULL WIDTH ARRAY SCAN HEAD CALIBRATION APPARATUS

Wayne A. Buchar, Holcomb; Keith A. Nau, Webster, and Pierre A. Lavallee, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 11, 1989, Ser. No. 449,670
Int. Cl.[5] G03G *15/28*
U.S. Cl. 355—233 18 Claims



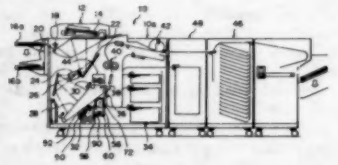
1. An input scanner having a document input, a document output and a document transport arrangement for carrying documents from said input to said output along a paper path, a scanning station located along said paper path for scanning documents transported therepast having at least one scanning element including a frame integrally supporting an illumination source, a lens and an array of photosensitive elements, and means for providing a calibration target for said scanning element, said calibration target providing means comprising:
means for supporting said scanning element for rotation about an axis, transverse to the direction of paper travel along said paper path, and parallel to said paper path; and
means for driving said scanning element in rotation about said axis, to bring said illumination source, said lens and said array of photosensitive elements to a position for detect said calibration target.

4,967,234

IMAGE FORMING APPARATUS

Tatsuo Tani, Urayasu; Mutsuo Watanabe, and Shigeru Muramatsu, both of Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,866
Int. Cl.[5] B03G *15/06*
U.S. Cl. 355—260 5 Claims



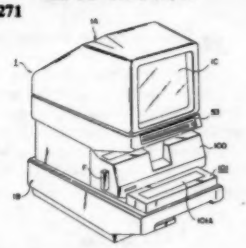
1. An image forming apparatus having an image carrier, comprising:
a developing unit for developing an electrotatic latent image formed an said image carrier by a developer;
agitating means for agitating the developer which is stored in said developer unit;
a developer cartridge for supplying the developer to said developing unit in a predetermined developer supply position which is defined in a body of said apparatus;
an opening formed through a housing portion of said body of said apparatus for inserting and removing said developer cartridge from the developer supply position; and
cartridge sensing mean for determining if said developer cartridge is loaded in the developer supply position in a condition which allows said apparatus to perform an image forming operation and, if said developer cartridge is not loaded, disenabling said agitating means.

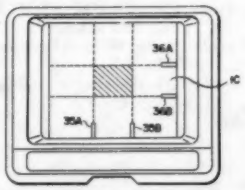
4,967,235

IMAGE FORMATION APPARATUS FOR DISPLAYING OR RECORDING A PRE-SELECTED IMAGE AREA OF A FILM

Takeshi Sanbayashi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 29, 1988, Ser. No. 277,691
Claims priority, application Japan, Nov. 30, 1987, 62-302682; Nov. 30, 1987, 62-302693; Nov. 30, 1987, 62-302695
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—271 23 Claims





1. An image formation apparatus comprising:
recording means having an image;
display means for displaying the image recorded in said recording means;
designating means for designating an arbitrary area of said display means;
first image-forming means for forming an image recorded on said recording means through first forming process;
second image-forming means for forming an image recorded in said recording means through a second image forming process;
selecting means for selecting said first image forming means or said second image forming means;
memory means for storing information of the area designated by said designating means; and
moving means for moving said designating means in accordance with information of the area stored in said memory means to display the area.

4,967,236

CHARGE RETENTION XEROPRINTING

Orville C. Rodenberg; William Mey; Francis M. Paczkowski, and Salvatore Leone, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1989, Ser. No. 457,614
Int. Cl.[5] G03G *15/14*
U.S. Cl. 355—272 15 Claims

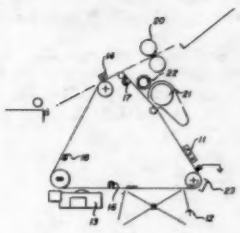
13. A xeroprinting apparatus comprising:
a photoconductive imaging member,

means for applying a charge to said imaging member of either a first or second polarity,

means for imagewise exposing said imaging member to create an electrostatic image,

means for applying toner of a second polarity to said imaging member to create a first toner image defined by said electrostatic image,

means for applying a charge of a polarity opposite said second polarity to said imaging member,



means for exposing said imaging member to an erase illumination through the base of the imaging member,

means for applying toner of a second polarity to said imaging member to create a second toner image overlying said first toner image,

means for applying a erase illumination through the base of said imaging member,

means for transferring said second toner image to a receiving sheet without transferring said first toner image.

4,967,237

ROLLER-DRIVING DEVICE FOR FIXING DEVICE

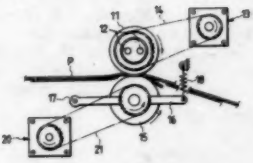
Yutaka Sasaki, and Shinichi Murakami, both of Saitama, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 245,171

Claims priority, application Japan, Sep. 16, 1987, 62-229738

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—290 **12 Claims**



1. A system for fixing a toner image to a paper comprising:

a first rotatably mounted roller having a peripheral surface for contact with the side of the paper having the toner image thereon for heating the toner image;

a second rotatably mounted roller having a peripheral surface for contact with the other side of the paper in pressure engagement with said peripheral surface of said firs roller for applying nipping pressure simultaneously with the heating; and

means for rotating said first and second rollers respectively for driving said peripheral surfaces at different velocities, said velocities differing by an amount at least sufficient to provide a slippage between said first roller and the paper held between said first and second rollers to minimize paper rucking, but differing by an amount insufficient to effectively distort the toner image.

4,967,238

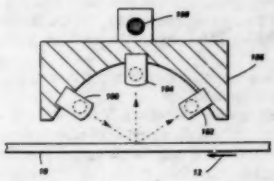
CLEANING PERFORMANCE MONITOR

Jan Bares, and Richard H. Tuhro, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 22, 1988, Ser. No. 288,603

Int. Cl.[5] G03G *21/00, 15/06*

U.S. Cl. 355—296 **41 Claims**



1. In an electrostatographic device including an imaging surface, moving along a continuous path, means for creating a latent image on the imaging surface, means for developing the latent image with toner, means for imagewise transferring the toner to a second surface, a cleaner for removing residual toner remaining on the imaging surface after transfer; and a cleaner performance monitor comprising:

a light source arranged to illuminate the imaging surface after the imaging surface is cleaned and before a latent image is developed on the imaging surface;

a light intensity detector arranged to detect intensity of light reflected from the imaging surface from the light source, and producing a signal indicative of the presence or absence of toner thereon.

4,967,239

PRINTER HAVING A REVERSIBLE MOTOR AND SEPARATE TRANSMISSIONS SYSTEMS

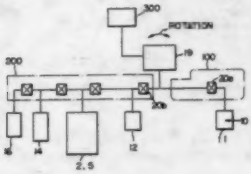
Sigeki Sakakura, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

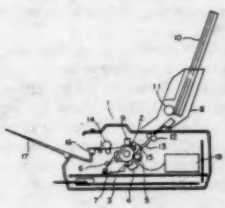
Continuation of Ser. No. 250,173, Sep. 28, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 467,357

Claims priority, application Japan, Sep. 30, 1987, 62-246716

Int. Cl.[5] C03G *15/00*

U.S. Cl. 355—309 **10 Claims**





9. An image forming apparatus having a printing zone, comprising:

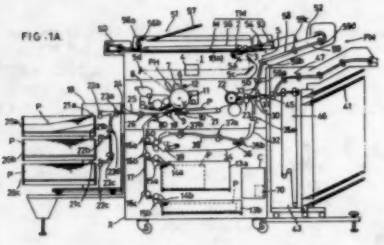
hopper means for holding a plurality of medium in cut sheet form;
a rotating image carrier;
a developer for forming a toner image on a surface of the image carrier;
a pickup roller for individually removing medium from the hopper;
a registration roller for introducing the medium removed by the pickup roller into the printing zone;
a fuser for fixing the toner image on the medium;
eject means for discharging the medium from the printing zone;
transport means for transporting the medium through the printing zone; and
a motor selectively rotatable in a first, normal direction and a second, reverse direction according to commands output from a control unit for driving a plurality of rotating elements which include at least the rotating image carrier and the pickup roller, torque derived from said motor being transmitted to the pickup roller through a first transmission system incorporating a first one-way clutch, which transmits only one directional rotation of the motor, and to rotating elements other than the pickup roller through a second transmission system incorporating a second one-way clutch, which transmits only the opposite directional rotation of the motor.

4,967,240

RECORDING APPARATUS

Hiroshisa Kitano; Itaru Saito; Ken Matsubara; Kouichi Shingaki; Tomohiko Masuda, and Yuji Enoguchi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 26, 1989, Ser. No. 343,525
Claims priority, application Japan, Apr. 26, 1988, 63-103101
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—318 **10 Claims**



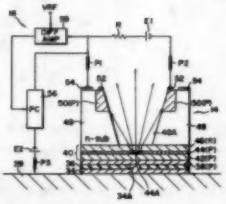
1. A recording apparatus, comprising:
copying means for projecting an image of an original document onto a charged photosensitive member through an optical system to form an electrostatic latent image on the photosensitive member, developing the electrostatic latent image and transferring and fixing a resulting visible image onto recording paper;
printing means for forming an electrostatic latent image on said photosensitive member in response to image information, said printing means including a light source, a PLZT shutter array, and shutter drivers for controlling respective shutters of said PLZT shutter array in response to the image information, whereby light beams are allowed by the image information to pass through said shutters to form the electrostatic latent image on said photosensitive member;
document feed means for feeding the original document for exposing by said optical system;
transport means for transporting the recording paper with the visible image fixed thereto to said document feed means to sue said recording paper as the original document;
paper discharge means for discharging the recording paper with the visible image fixed thereto; and
selecting means for selectively delivering the recording paper with the visible image fixed thereto to said transport means or said paper discharge means.

4,967,241

SEMICONDUCTOR LIGHT EMITTING DEVICE

Hideaki Kinoshita, and Toshiaki Tanaka, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 843,658, Mar. 26, 1986, abandoned. This application Nov. 6, 1989, Ser. No. 432,359
Claims priority, application Japan, Mar. 26, 1985, 60-61480
Int. Cl.[5] H01L *3/12, 31/16*
U.S. Cl. 357—19 **12 Claims**



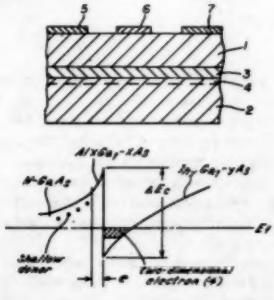
1. A semiconductor light emitting device comprising:
a semiconductor substrate;
a window formed in said semiconductor substrate;
a double-hetero type light emitting means, formed on said semiconductor substrate, said means being thinner than a thickness of said semiconductor substrate, for emitting a light beam perpendicularly to said semiconductor substrate through said window.
photosensing means formed in said semiconductor substrate and facing said window, for receiving the emitted light and for generating an electrical signal in accordance with an intensity of the admitted light; and
heat sink means coupled to said light emitting structure for dissipating heat therefrom.

4,967,242

HETEROJUNCTION FIELD EFFECT TRANSISTOR

Takuji Sonoda, and Kazu [illegible]ayashi, both of Itami, Japan, assignors to Mitsubishi [illegible] Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 300,262
Claims priority, application Japan, Jan. 21, 1988, 63-12251
Int. Cl.[5] H01L *29/205, 29/80*
U.S. Cl. 357—22 **3 Claims**



1. A heterojunction field effect transistor comprising:
a channel layer and a carrier supplying layer separated by a spacer layer;
the carrier supplying layer having a charge carrier density

with a minimum deep level density for creating a two-dimensional electron gas in the channel layer;

the channel layer having the largest electron affinity among the three layers constituting the heterojunction FET; and

the spacer layer interposed between the carrier supplying layer and the channel layer and comprising means for reducing Coulomb interaction between two-dimensional carriers in the channel layer and ions in the carrier supplying layer, the spacer layer comprising a material which increases the effective conduction band discontinuity ΔE_c between the carrier supplying layer and the channel layer, the spacer layer having a graded band gap from substantially zero percent aluminum concentration at the junction with the carrier supplying layer to the maximum proportion x of aluminum concentration at the junction with the channel layer.

4,967,243

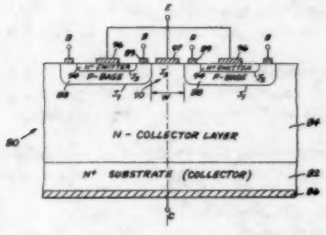
POWER TRANSISTOR STRUCTURE WITH HIGH SPEED INTEGRAL ANTIPARALLEL SCHOTTKY DIODE

Bantval J. Baliga, Clifton Park, N.Y., and Martin F. Schlecht, Lexington, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 19, 1988, Ser. No. 221,482

Int. Cl.[5] H01L *27/02, 29/72*

U.S. Cl. 357—23.4 **7 Claims**



1. A high power semiconductor device comprising:

a heavily doped semiconductor substrate of a first conductivity type;

first electrode means formed on a first surface of said substrate;

a semiconductor layer of said first conductivity type situated on a second surface of said substrate so as to form an interface therewith, said layer being less heavily doped than said substrate;

a base region of a second conductivity type extending into said layer from the surface thereof opposite said interface, said base region being shaped to at least partially surround a portion of said surface of said layer, said base region forming a P-N junction with said layer;

second electrode means overlying said surface of said layer at least partially surrounded by said base region and forming a Schottky barrier with said layer;

a heavily doped region of said first conductivity type extending into said base region from said surface of said layer;

third electrode means in contact with said heavily doped region; and

fourth electrode means in contact with said base region.

4,967,244

POWER SEMICONDUCTOR COMPONENT WITH SWITCH-OFF FACILITY

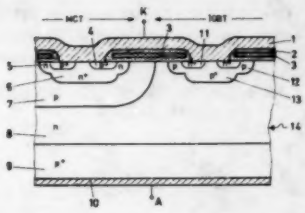
Friedheim Bauer, Würenlingen, Switzerland, assignor to Asea Brown Boveri Ltd, Baden, Switzerland

Filed Apr. 7, 1989, Ser. No. 334,567

Claims priority, application Switzerland, Apr. 22, 1988, 1520/88

Int. Cl.[5] H01L *29/10, 29/78, 29/74, 27/02*

U.S. Cl. 357—23.4 **7 Claims**



1. A power semiconductor component with switch-off facility, comprising:

a plurality of unit cells arranged next to each other and connected in parallel in a semiconductor substrate between an anode and a cathode;

each of said unit cells constructed as an MOS-controlled thyristor (MCT=MOS Controlled Thyristor) which can be switched off by means of a field-effect-controlled short circuit; and

means for ensuring the field-effect-controlled switching-on of the component;

wherein:

said means for ensuring means comprise further unit cells which are arranged between the MCT unit cells and are connected in parallel with the latter;

each of the further unit cells has the structure of a bipolar transistor with insulated gate (IGBT=Insulated Gate Bipolar Transistor);

each MCT unit cell comprises, between the anode (A) and the cathode (K), a layer sequence composed of a heavily-doped emitter layer of a first conductivity-type, a medium-doped base layer of a second conductivity-type, a medium-doped base layer of the first conductivity-type, and a heavily-doped emitter region of the second conductivity-type with laterally adjacent medium-doped channel regions of the second conductivity-type and embedded heavily-doped source regions of the first conductivity-type;

in the MCT unit cells, the source regions, the channel regions and the base layer of the first conductivity-type emerge next to each other at the cathode-side surface of the semiconductor substrate and in each case form a first conductivity-type-channel MOSFET with an insulated gate electrode situated above it;

each IGBT unit cell comprises, between the anode and the cathode a layer sequence composed of a heavily-doped emitter layer of the first conductivity-type, a medium-doped base layer of the second conductivity-type and a heavily-doped region of the first conductivity-type with laterally adjacent medium-doped channel regions of the first conductivity-type and embedded heavily-doped source regions of the second conductivity-type;

in the IGBT unit cells, the source regions, the channel regions and the second conductivity-type base layer emerge next to each other at the cathode-side surface of the semiconductor substrate and in each case form a second conductivity-type-channel MOSFET with an insulated gate electrode situated above it; and

the first conductivity-type emitter layers and the second conductivity-type base layers of both elementary cells are

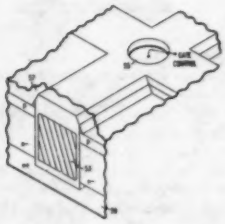
in each case part of a common first conductivity-type emitter layer or second conductivity-type base layer respectively extending laterally over the semiconductor substrate.

4,967,245

TRENCH POWER MOSFET DEVICE

Adrian I. Cogan, San Jose, and Neill R. Thornton, Alameda, both of Calif., assignors to Siliconix incorporated, Santa Clara, Calif.

Filed Mar. 14, 1988, Ser. No. 167,617
Int. Cl.[5] H01L *29/78, 29/06*
U.S. Cl. 357—23.4 **4 Claims**



1. A high cell density product for power MOSFETS, the product being produced by the following method:

providing a heavily doped substrate, of first conductivity type, having a top surface;

providing a first layer of lightly doped material of first conductivity type on top of and contiguous to the substrate;

providing a second layer of second conductivity type opposite to the first conductivity type, on top of and contiguous to the first layer, with the first layer being positioned between the substrate and the second layer;

providing a third layer of heavily doped material, of first conductivity type, on top of and contiguous to the second layer, with second layer being positioned between the first layer and the third layer:

producing a substantially rectangular or trapezoidal groove in the combined first layer/second layer/third layer that reaches through all of a transverse section of the second layer, and reaches through a portion but not all of a transverse section of the first layer and exposes a bottom wall and said walls of the groove;

providing a thick oxide layer inside the groove covering the bottom wall of the groove;

providing a thin oxide layer inside the groove covering all side walls of the groove;

providing polysilicon that fills the groove;

providing a covering layer of substantially undoped oxide material that selectively covers the polysilicon at the top of the groove and immediately adjacent to the groove boundary at the top surface thereof so that no part of the polysilicon in the groove is exposed;

removing substantially all of the third layer except a small region adjacent the thin oxide layer, so that a surface of the second layer is exposed; and

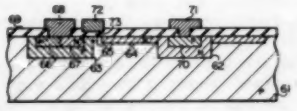
providing a metallized layer of material covering and contiguous to the top surface of the second layer, the tip of the groove and all polysilicon material adjacent to the boundary of the groove.

4,967,246

STRUCTURE OF INSULATED GATE BIPOLAR TRANSISTORS

Akio Tanaka, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 24, 1988, Ser. No. 261,708
Claims priority, application Japan, Oct. 27, 1987, 62-272216
Int. Cl.[5] H01L *29/78*
U.S. Cl. 357—23.4 **5 Claims**



1. A semiconductor device comprising:

(a) a semiconductor layer of a first conductivity type having a surface portion;

(b) a well of said first conductivity type formed in the surface portion of said semiconductor layer and having an impurity atom concentration higher than that of said semiconductor layer;

(c) a base region of a second conductivity type formed in the surface portion of said semiconductor layer and spaced apart from said well, said second conductivity type being opposite to said first conductivity type;

(d) a heavily doped first source region of said first conductivity type formed in said well;

(e) a heavily doped second source region of said second conductivity type formed in said well and located adjacent to said heavily doped first source region;

(f) a source electrode contacting said heavily doped first and second source regions;

(g) a heavily doped drain region of said first conductivity type formed in said base region;

(h) a drain electrode contacting said heavily doped drain region;

(i) an extension of said second conductivity type projecting from an upper portion of said base region and having an impurity atom concentration lower than that of said base region;

(j) a gate insulating film formed over said surface portion between said extension and said well and over a portion of the well between said heavily doped second source region and the surface portion; and

(k) a gate electrode formed on said gate insulating film, in which said base region is surrounded by said extension.

4,967,247

VERTICAL DYNAMIC RANDOM ACCESS MEMORY

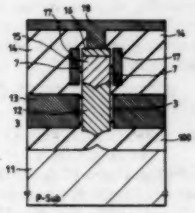
Toru Kaga, Saitama; Yoshifumi Kawamoto, Kanagawa, and Hideo Sunami, Tokyo, all of Japan, assignors to Hitachi, Ltd, Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 279,350
Claims priority, application Japan, Dec. 10, 1987, 62-310821
Int. Cl.[5] H01L *29/78, 27/02, 27/12, 29/06*
U.S. Cl. 357—23.6 **27 Claims**

1. A semiconductor memory integrated circuit comprising:

at least one pair of switching and charge-storage devices are disposed adjacent upper and lower sides, respectively, of each of a plurality of semiconductor islands which are

formed on a semiconductor substrate, the islands being isolated from said semiconductor substrate and from each



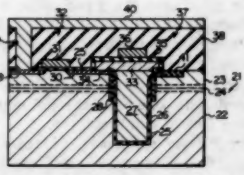
other by an insulator means, said switching and charge-storage devices having substantially the same width.

4,967,248

STRUCTURE OF SEMICONDUCTOR MEMORY CELL WITH TRENCH-TYPE CAPACITOR

Toshiyuki Shimizu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 181,136
Claims priority, application Japan, Apr. 15, 1987, 62-93660
Int. Cl.[5] H01L *29/68, 29/34, 29/06*
U.S. Cl. 357—23.6 **10 Claims**



1. A semiconductor memory cell comprising a switching transistor and a storage capacitor fabricated in a multiple level semiconductor substrate structure having a heavily doped substrate layer and a lightly doped epitaxial layer grown on an upper surface of the heavily doped substrate layer, a transition layer graded in impurity atom concentration being produced between said heavily doped substrate layer and said lightly doped epitaxial layer, said storage capacitor comprising:

(a) a first electrode formed by a first side wall portion of said lightly doped epitaxial layer, a second side wall portion of said heavily doped substrate layer and a bottom wall portion of the heavily doped substrate layer, said first and second side wall portions and said bottom wall portion defining a cavity,

(b) a dielectric film formed on said first and second side wall portions and said bottom wall portion and defining a trench, and

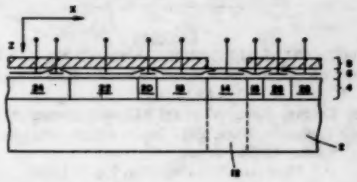
(c) a second electrode formed in said trench and contacting said dielectric film, wherein said dielectric film has a relatively thin portion, and a relatively thick portion wherein said relatively thick portion covers a part of said lightly doped epitaxial layer, said transition layer and a part of said heavily doped substrate layer, said part of said doped epitaxial layer being contiguous to said transition layer on one side thereof, said part of said heavily doped substrate layer being contiguous to said transition layer on the other side thereof.

4,967,249

GAIN COMPRESSION PHOTODETECTOR ARRAY

Paul P. Suni, San Mateo, Calif., assignor to Loral Fairchild Corporation, Syosset, N.Y.

Filed Mar. 17, 1989, Ser. No. 324,925
Int. Cl.[5] H01L *29/78, 27/14;* H04N *3/14;* G11C *19/28*
U.S. Cl. 357—24 **9 Claims**



1. A semiconductor device comprising:

(a) a mobile charge packet generation region;

(b) a first potential well adjacent said mobile charge packet generation region, said first potential well having a first potential barrier and a second potential barrier, said first potential barrier greater than said second potential barrier;

(c) a drain region adjacent said second potential barrier; and

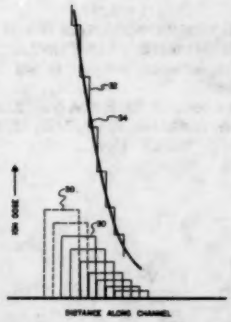
(d) a plurality of gain wells adjacent said first potential barrier and connected to said generation region by a diffusion region, whereby a gain control curve for said semiconductor device includes a break corresponding to saturation of each of said gain wells.

4,967,250

CHARGE-COUPLED DEVICE WITH FOCUSED ION BEAM FABRICATION

William M. Clark, Jr., Thousand Oaks; Robert H. Walden, Westlake Village, and Mark W. Utlaut, Saugus, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 46,019, May 5, 1987, abandoned. This application Oct. 23, 1989, Ser. No. 426,481
Int. Cl.[5] H01L *29/78;* G11C *19/28*
U.S. Cl. 357—24 **15 Claims**



1. In a charge-coupled device (CCD) comprising a semiconductor substrate and an array of electrodes having defined electrode lengths and widths for establishing a corresponding array of potential well cells having defined cell lengths and widths in the semiconductor substrate, and for moving charge packets among the cells in the direction of the cell lengths, the cells having respective dopant implant density gradients in the direction of their lengths, the improvement comprising the dopant implants being provided as lateral successions of overlapping but discrete focused ion beam (FIB) implants extending substantially across the cell widths, with each scan dis-

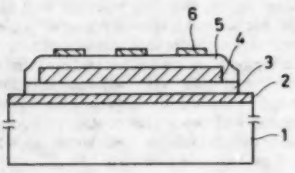
placed from its preceding scan in the direction of the cell lengths, the doping levels of the FIB implants accumulating to a stepwise approximation of a desired dopant density profile having a plurality of steps, the widths of said steps in the direction of the cell lengths being no greater than about half the widths of the discrete FIB implants and no greater than about 750 Angstroms, and the widths of the discrete FIB implants being in the approximate range of 750–1,500 Angstroms.

4,967,251

THIN FILM ELECTROLUMINESCENT DEVICE CONTAINING GADOLINIUM AND RARE EARTH ELEMENTS

Koichi Tanaka, Nara; Akiyoshi Mikami, Yamatotakada, and Kouji Taniguchi, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 10, 1989, Ser. No. 391,998
Claims priority, application Japan, Aug. 12, 1988, 63-202161
Int. Cl.[5] H01L *27/14, 37/00, 49/02*
U.S. Cl. 357—30 **25 Claims**



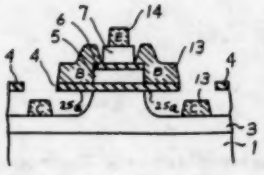
1. A thin film electroluminescent (EL) device comprising:
a luminescent layer, both sides of which are covered with insulating layers; and
at least one pair of electrodes sandwiching said luminescent layer through the insulating layers, said luminescent layer being composed of zinc sulfide, in which Gd and a luminously effective amount of a rare earth element act as a luminescent center and are doped at a total amount of 1–4 atomic percent.

4,967,252

COMPOUND SEMICONDUCTOR BIPOLAR DEVICE WITH SIDE WALL CONTACT

Yuji Awano, Tokyo, Japan, assignor to 501 Fujitsu Limited, Kawasaki, Japan

Filed Mar. 15, 1989, Ser. No. 323,978
Claims priority, application Japan, Mar. 18, 1988, 63-066212
Int. Cl.[5] H01L *29/72*
U.S. Cl. 357—34 **19 Claims**



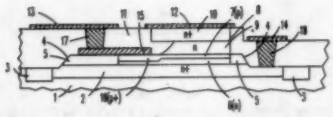
1. A compound semiconductor device structure comprising:
a substrate;
a first layer comprising at least a first compound semiconductor, and including a mesa with a top contact area;
an intermediate layer contacting said contact area of said first layer and comprising a second compound semiconductor;
a second layer having a top portion, side walls, having a bottom portion contacting said intermediate layer in a region overlying said contact area, and comprising at least said first compound semiconductor;
an electrode contacting at least one of said side walls and extending laterally outside of said contact area; and
a third layer overlying said second layer comprising said first compound semiconductor.

4,967,253

BIPOLAR TRANSISTOR INTEGRATED CIRCUIT TECHNOLOGY

Chakrapani G. Jambotkar, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,830
Int. Cl.[5] H01L *29/72*
U.S. Cl. 357—34 **9 Claims**



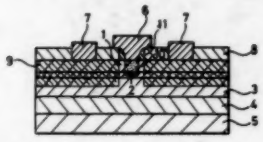
1. A bipolar transistor wherein in a semiconductor body, emitter and collector electrodes are separated by a base electrode, comprising:
a semiconductor substrate,
a first electrode, being one of said emitter and collector, said first electrode having,
a first layer, of a first conductivity type, high conductivity, with a first area, being positioned with one face on said substrate and surrounded by a first isolation region,
a second layer, of said first conductivity type with normal conductivity, that is lower than said high conductivity, with a second area that is smaller than said first area, positioned with one face thereof epitaxial with the remaining face of said first layer,
a base electrode layer coextensive in area with said second layer of said first electrode,
said base electrode layer having one face thereof epitaxial with the remaining face of said second layer of said first electrode, having an opposite conductivity type to said first conductivity type, having a normal conductivity intrinsic portion with a third area corresponding to the base to emitter junction area designed for said transistor, and an extrinsic electrical contacting portion higher in conductivity than said intrinsic portion,
a second isolation region surrounding the coextensive combination of said second layer of said first electrode and said base electrode layer, with a thickness sufficient to be planar with the remaining face of said base electrode layer,
a second electrode, being the other one of said emitter and collector electrodes, having a layer with an area the same as said third area with one face thereof epitaxial with said intrinsic portion of said base electrode layer,
a base contacting metal member, positioned on said second isolation region and on said extrinsic portion of said base electrode layer, and extending proximate to, but separated from, said second electrode layer,
insulating material covering said transistor, surrounding said second electrode, and extending at least to said first isolation region,
first global electrical wiring to said first electrode supported by said insulating material and connected with a reachthrough to said first layer of said first electrode,
second global electrical wiring to said second electrode supported by and connected to contacting means to said second electrode layer, and

third global electrical wiring to said base electrode supported by said insulating material and connected to said base contacting metal member at a location along the length thereof including the portion supported by said second isolation region beyond said base layer.

4,967,254
SEMICONDUCTOR DEVICE

Teruyuki Shimura, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 11, 1988, Ser. No. 217,292
Claims priority, application Japan, Jul. 16, 1987, 62-179343; Jul. 16, 1987, 62-179344
Int. Cl.[5] H01L *29/72*
U.S. Cl. 357—34 **12 Claims**



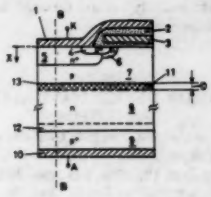
1. A semiconductor device comprising:
a collector layer comprising a first conductivity type semiconductor layer;
a base layer comprising a second conductivity type semiconductor layer disposed on said collector layer;
an emitter layer comprising a first conductivity type semiconductor layer disposed on said base layer;
an undoped semiconductor contact layer disposed on said emitter layer;
two spaced apart second conductivity type semiconductor first contact regions having a central region therebetween, each first contact region being disposed adjacent and contacting said undoped contact layer, said emitter layer, and said base layer, and spaced from said collector layer;
base electrodes respectively disposed in contact with each of said first regions;
a first conductivity type semiconductor second region disposed in the central region spaced from said first contact regions and adjacent and contacting said undoped contact layer and said emitter layer; and
an emitter electrode disposed in contact with said second region.

4,967,255
CONTROLLABLE POWER SEMICONDUCTOR COMPONENT

Friedhelm Bauer, Würenlingen, and Horst Grüning, Baden, both of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Aug. 21, 1989, Ser. No. 396,227
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832208
Int. Cl.[5] H01L *29/00, 29/10, 29/06, 27/02*
U.S. Cl. 357—37 **5 Claims**

1. Controllable power semiconductor component, comprising
(a) an anode (A), a cathode (K) and a gate;
(b) between the anode (A) and the cathode (K) a layer sequence of a p-type emitter layer (9), an n-type base layer (8), a p-type base layer (7) and an n-type emitter layer (5); and
(c) on the side of the cathode (K) a gate-cathode structure; wherein
(d) an n-doped intermediate layer (11) is arranged between the n-type base layer (8) and the p-type base layer (7); and

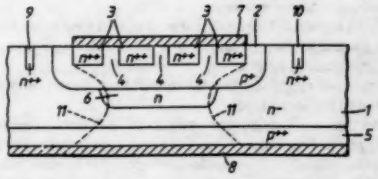


(e) the doping concentration (c) in the intermediate layer (11) is higher than in the n-type base layer (8).

4,967,256
OVERVOLTAGE PROTECTOR

Vijay K. Pathak, and Christopher T. Green, both of Bedford, England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 8, 1988, Ser. No. 216,757
Int. Cl.[5] H01L *29/74, 29/72, 29/90*
U.S. Cl. 357—38 **8 Claims**



1. A semiconductor device comprising:
a substrate of semiconductor material having a body portion of one conductivity type provided with a top surface and a bottom surface;
a first region of the other conductivity type disposed in said body portion and opening into the top surface thereof;
said body portion of said one conductivity type and said first region of said other conductivity type defining a first PN junction interface therebetween;
a second region of said one conductivity type disposed in said first region of said other conductivity type and opening onto the top surface of said body portion;
said first region of said other conductivity type and said second region of said one conductivity type defining a second PN junction interface therebetween;
said first PN junction interface being of greater area than the area of said second PN junction interface;
a third region of said other conductivity type disposed on the bottom surface of said body portion of said one conductivity type;
a single buried region of said one conductivity type disposed in said body portion and opening onto said first PN junction interface between said body portion and said first region to define a composite PN junction interface therewith in which the interface between said buried region of said one conductivity type and said first region of said other conductivity type defines a PN junction forming a portion of the total composite PN junction interface;
said buried region of said one conductivity type having a higher dopant impurity concentration than that of said body portion of said one conductivity type; and
the PN junction interface between said buried region of said

one conductivity type and said first region of said other conductivity type being of substantially smaller area than the area of said second PN junction interface;

whereby reverse breakdown of said composite PN junction interface preferentially occurs through said buried region of said one conductivity type.

4,967,257

SEMICONDUCTOR DEVICE HAVING FIELD EFFECT TRANSISTORS

Yasuo Inoue, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 301,402

Claims priority, application Japan, Jan. 29, 1988, 63-020733

Int. Cl.[5] H01L *27/02, 29/78*

U.S. Cl. 357—42 **9 Claims**

6. A semiconductor device having an array of elemental cells, each of said elemental cells comprising:

a semiconductor substrate having a main surface;

a first semiconductor region of a first conductivity type and a first trench formed in said semiconductor substrate, wherein a portion of side wall surfaces of said first trench includes an exposed surface of said first semiconductor region;

first and second impurity regions of a second conductivity type formed spaced apart from each other in said first semiconductor region, said first and second impurity regions defining a first channel region in said first semiconductor region including said exposed surface of said first semiconductor region;

a first gate insulating layer formed in said first trench on said exposed surface of said first semiconductor region of said first channel region;

a first gate electrode formed in said first trench on said first gate insulating layer;

a second semiconductor region of the first conductivity type, a first side of said second semiconductor region being positioned approximately parallel to said first semiconductor region, a third semiconductor region of the second conductivity type positioned opposed to a second side of said second semiconductor region which is opposite from said first side, and a second trench formed in said semiconductor substrate, wherein a portion of side wall surface of said second trench includes exposed surfaces of said second and third semiconductor regions;

third and fourth impurity regions of the second conductivity type formed spaced apart from each other in said second semiconductor region, said third and fourth impurity regions defining in said second semiconductor region a second channel region including said exposed surface of said second semiconductor region;

a second gate insulating layer formed in said second trench on said exposed surface of the second semiconductor region of said second channel region;

a second gate electrode formed in said second trench on said second gate insulating layer;

fifth and sixth impurity regions of the first conductivity type formed spaced apart from each other in said third semiconductor region, said fifth and sixth impurity regions defining in said third semiconductor region a third channel region including said exposed surface of said third semiconductor region;

a third gate insulating layer formed in said concave portion on said exposed surface of said third semiconductor region of said third channel region; and

a third gate electrode formed in said second trench on said third gate insulating layer;

wherein first, second and third channel surfaces for respectively defining a magnitude of a carrier path in said first, second and third channel regions are formed in planes that are approximately perpendicular to the main surface of said semiconductor substrate.

4,967,258

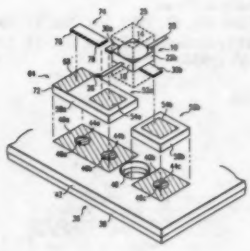
STRUCTURE FOR USE IN SELF-BIASING AND SOURCE BYPASSING A PACKAGED, FIELD-EFFECT TRANSISTOR AND METHOD FOR MAKING SAME

Michael J. Fithian, Boulder, and James E. Foster, Longmont, both of Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Mar. 2, 1989, Ser. No. 319,367

Int. Cl.[5] H01L *27/02, 23/78, 23/02, 39/02*

U.S. Cl. 357—51 **25 Claims**



1. A self-biased and source bypassed, packaged, field-effect transistor structure, comprising:

a packaged, field-effect transistor including a housing having a defined width, a field-effect transistor located within said housing, and first and second source leads extending from said field-effect transistor, through said housing, and outward from said housing;

means for grounding, wherein at least a portion of said housing is located intermediate said packaged, field-effect transistor and said means for grounding;

a source resistor for use in biasing the field-effect transistor, said source resistor having a first terminal electrically contacting said means for grounding and a second terminal electrically contacting at least one of the source leads;

a first capacitor for use in grounding the first source lead of the field-effect transistor during AC operation, said first capacitor having a first lower plate electrically contacting said means for grounding and a first upper plate separated from said first lower plate by a first dielectric, wherein said first upper plate of said first capacitor is positioned adjacent to the first source lead of the packaged, field-effect transistor for direct electrical connection therewith;

a second capacitor for use in grounding the second source lead of the field-effect transistor during AC operation, said second capacitor have a second lower plate electrically contacting said means for grounding and a second upper plate separated from said second lower plate by a second dielectric, wherein said second upper plate of said second capacitor is positioned adjacent to the second source lead of the packaged, field-effect transistor for direct electrical connection therewith.

4,967,259

WAFER HAVING A DICING AREA HAVING A STEP REGION COVERED WITH A CONDUCTIVE LAYER AND METHOD OF MANUFACTURING THE SAME

Hiroshi Takagi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1989, Ser. No. 385,879

Claims priority, application Japan, Jul. 27, 1988, 63-188816

Int. Cl.[5] H01L *23/48, 23/46, 29/62, 29/44*

U.S. Cl. 357—68 **8 Claims**

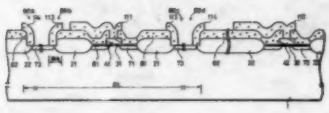
1. A wafer comprising:

a semiconductor substrate having a main surface;

a plurality of chip regions formed on said main surface of said semiconductor substrate;

a dicing area formed around the entire periphery of one chip region and between said one chip region and an adjacent

chip region so as to isolate said chip regions to form individual chips, the bottom surface of said dicing area being lower than said chip regions, thereby forming step region between said dicing area and each of said chip regions; and



first and second conductive films formed on opposite side walls of said step region, said conductive films being spaced apart and electrically isolated from each other access said step region.

4,967,260

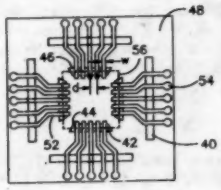
HERMETIC MICROMINIATURE PACKAGES

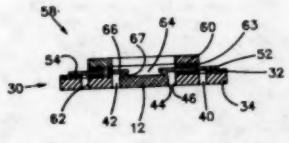
Sheldon H. Butt, Godfrey, Ill., assignor to International Electronic Research Corp., Burbank, Calif.

Filed May 4, 1988, Ser. No. 188,322

Int. Cl.[5] H01L *23/06, 23/14*

U.S. Cl. 357—70 **32 Claims**





1. A test frame adapted to support and electrically connect to an electronic device, comprising:

a first ring frame containing a plurality of interior slots incompletely circumscribing a central portion of said first ring frame and a plurality of external slots incompletely circumscribing both said central portion of said first ring frame and said interior slots;

a second ring frame sized to fit within an area defined by the inner edges of said exterior slots and the outer edges of said interior slots;

a metallic foil disposed between said first and second ring frames; and

a means for bonding said metallic foil to said first and second ring frames.

4,967,261

TAPE CARRIER FOR ASSEMBLING AN IC CHIP ON A SUBSTRATE

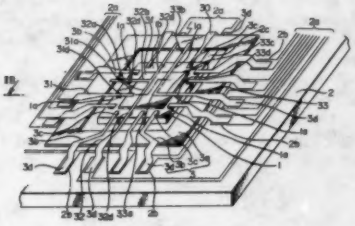
Kenichi Niki; Toru Kokogawa, and Hayato Takasago, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 219,569, Jul. 15, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 442,416

Claims priority, application Japan, Jul. 30, 1987, 62-191695; Aug. 24, 1987, 62-208349

Int. Cl.[5] H01L *23/48, 23/12*

U.S. Cl. 357—70 **12 Claims**



1. A tape carrier for establishing a plurality of electrical connections between respective electrodes disposed on a surface of a semiconductor chip and external circuitry comprising:

a first electrically insulating film including a central opening in which a semiconductor chip having a surface on which a plurality of electrodes are disposed may be placed;

a plurality of unitary electrically conducting leads, each lead including an inner end projecting into the opening for connection to at least one electrode of the semiconductor chip, a central portion disposed on and supported by said first film, and an outer end for connection to external circuitry, the inner end of at least one of said unitary leads extending entirely across the opening for connection to at least two electrodes of the semiconductor chip and being additionally supported by said first film after crossing the opening; and

a second electrically insulating film disposed within the opening, supporting and attached to said at least one unitary lead extending entirely across the opening, for disposition opposite the semiconductor chip intermediate the electrodes.

4,967,262

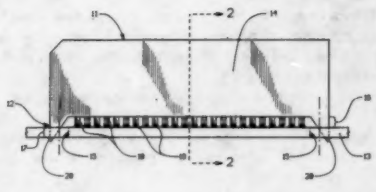
GULL-WING ZIG-ZAG INLINE LEAD PACKAGE HAVING END-OF-PACKAGE ANCHORING PINS

Warren M. Farnsworth, Nampa, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Nov. 6, 1989, Ser. No. 432,598

Int. Cl.[5] H01L *39/02, 23/16, 23/42, 23/44*

U.S. Cl. 357—80 **12 Claims**



1. A vertically-oriented semiconductor package, designed

for surface mounting on one pair of planar surfaces of a printed circuit board, said package comprising:

a body having a pair of substantially parallel, vertical planar sides, lower and upper horizontal edges and a substantially vertical edge at each end of the package;

a semiconductor die having a face on which integrated circuitry is constructed, said die being encapsulated within said body such that said face is positioned between and substantially parallel to the vertical planar sides of said body;

a plurality of inline leads, each of which is electrically connected, within said body, to a portion of the circuitry on said die, and each of which extends in a downward direction through the lower edge of said body, below which it is bent such that it is resiliently biased against the planar surface of the circuit board when the package is in a mounted position thereupon;

at least one downward-facing anchoring pin integral with said body at each end thereof; and

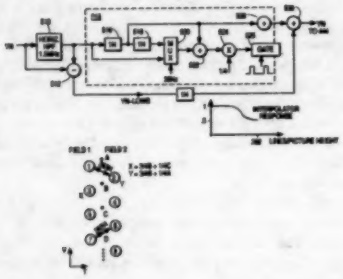
means for securely attaching each anchoring pin to the circuit board in order to maintain a mounted position thereupon during solder reflow operations.

4,967,263

WIDESCREEN TELEVISION SIGNAL PROCESSOR SYSTEM WITH INTERPOLATOR FOR REDUCING ARTIFACTS

Charles B. Dieterich, Kingston, N.J., assignor to General Electric Company, Princeton, N.J.

Filed Sep. 7, 1988, Ser. No. 241,684
Int. Cl.[5] H04N *9/64*
U.S. Cl. 358—11 **19 Claims**



1. A system for processing a video signal, comprising:

means for providing a video signal containing image information defined by picture elements (pixels);

translating means responsive to said video signal for providing a processed video signal with groups of mutually exclusive pixels of identical value within each group; and

means for interpolating said processed signal to reduce unwanted image artifacts attributable to said pixel groups, said interpolating means providing different interpolation during alternate image fields of a video signal containing said pixel groups.

19. In a system for receiving a television-type signal having image information defined by groups of mutually exclusive picture elements (pixels) of identical value within each group, apparatus comprising:

means for interpolating said television-type signal to produce an interpolated signal, said interpolation being frequency limited such that high frequency information is interpolated substantially exclusive of low frequency information; and

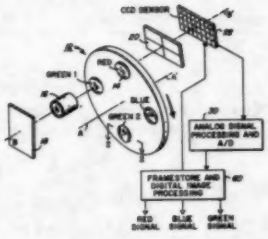
means for conveying said interpolated signal to an image signal processing channel.

4,967,264

COLOR SEQUENTIAL OPTICAL OFFSET IMAGE SAMPLING SYSTEM

Kenneth A. Parulski, Rochester; Thomas C. Nutting, Fairport, and Leslie G. Moore, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 343,766
Int. Cl.[5] H04N *9/07*
U.S. Cl. 358—44 **11 Claims**



1. An optical offset image sampling system comprising:

means for creating an image beam;

a rotating filter wheel intersecting said image beam and incorporating at least two angled glass plates of like, composition, color, and thickness at least one of which displaces the image by a distance equal to a fraction of the distance D between photosensitive elements;

an array of photosensitive elements positioned to receive the image beam which passes through each filter with each of said photosensitive elements capable of producing electrical signals indicative of the intensity of light incident thereon and each element having its center positioned a distance D from adjacent elements;

means for storing the electrical signals from each photosensitive element of said array for each separate glass plate; and

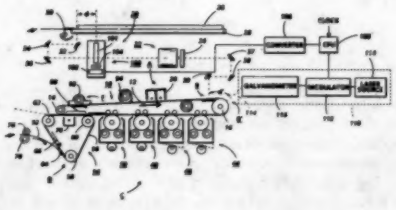
means for combining the stored electrical signals associated with each glass plate to form a higher resolution image.

4,967,265

COLOR CORRECTION SYSTEM FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE

James D. Rees, Pittsford; Richard F. Lehman, Webster, and Kenneth R. Ossman, Macedon, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 4, 1989, Ser. No. 332,821
Int. Cl.[5] H04N *1/46*
U.S. Cl. 358—75 **1 Claim**



1. An electrophotographic copying apparatus utilizing a raster input scanner (RIS) for color correction, the apparatus including a platen in a horizontal plane for supporting a colored original to be reproduced; scan/illumination means mounted for movement beneath said platen; imaging means coupled to said scan/illumination means and adapted for movement therewith for forming successive latent images

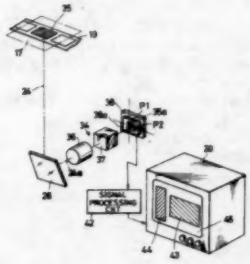
corresponding to different color separations of said document on the charged surface of a photoconductive member at a first exposure station, said RIS coupled to said scan illumination means, and adapted for movement therewith so as to scan said document simultaneously with said imaging means, said apparatus further including control means adapted to transmit a modulated color correction light patten in registration onto each color latent image formed by said imaging means at a second exposure station, said control means including means for processing output signals from said RIS and for applying control signals to a raster output scanner which generates the modulated color corrected output signal.

4,967,266

PHOTOGRAPHIC PRINTER WITH A MONITOR

Takashi Yamamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 30, 1989, Ser. No. 358,053
Claims priority, application Japan, May 27, 1988, 63-129929
Int. Cl.[5] G03F *3/10*
U.S. Cl. 358—76 **4 Claims**



1. A photographic printer including a monitor for displaying a simulated image of a picture frame of an original film to be printed, said printer comprising:

a printing optical system for forming an optical image of said picture frame to which a photographic paper is exposed so as to create a latent image thereon; and

electronic imaging means, having an image receiving surface for receiving said optical image and converting said optical image into video signals which are displayed as a simulated image on a screen of said monitor said image receiving surface being sc disposed as to have a center that is offset from an optical axis of said printing optical system, whereby displaying said simulated image of said optical image on said screen of said monitor leaves an area on said screen for displaying another image.

4,967,267

APPARATUS FOR FORMATTING AND VIEWING A STEREOSCOPIC VIDEO FRAME

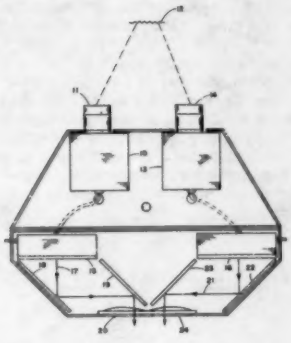
John K. Gallaher, Jr., Winston-Salem, N.C., assignor to Gallaher Business Development Corp., Winston-Salem, N.C.

Filed Jul. 10, 1989, Ser. No. 377,049
Int. Cl.[5] H04N *13/00*
U.S. Cl. 358—88 **13 Claims**

1. An apparatus for formatting the left and right images of a stereo video image pair of a scene in a single stereoscopic video frame, comprising:

first means for rotating one of the images of the stereo video image pair 90 degrees with respect to the orientation of said scene to form one-half of a stereoscopic video frame;

second means for rotating the other of the images of said stereo video image pair 90 degrees with respect to the orientation of said scene; and



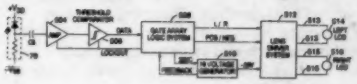
means for inverting said other rotated image to form the other half of said stereoscopic video frame.

4,967,268

LIQUID CRYSTAL SHUTTER SYSTEM FOR STEREOSCOPIC AND OTHER APPLICATIONS

Leany Lipton, Greenbrae, and Marvin Ackerman, Sunnyvale, both of Calif., assignors to StereoGraphics, San Rafael, Calif.

Filed Jul. 31, 1989, Ser. No. 387,622
Int. Cl.[5] H04N *13/04*
U.S. Cl. 358—92 **27 Claims**



1. A liquid crystal shutter system for selecting fields of a field-sequential image, including:

a liquid crystal cell assembly, for selectively transmitting fields of the field-sequential image in response to a drive signal;

a means for transmitting a pulse width encoded synchronization signal from a remote location to the liquid crystal cell assembly;

a receiver mounted adjacent the liquid crystal cell assembly for receiving the synchronization signal; and

a drive circuit electrically coupled to the liquid crystal cell assembly and the receiver, for generating the drive signal in response to the synchronization signal and supplying the drive signal to the liquid crystal cell assembly.

4,967,269

ENDOSCOPE AUTOMATIC LIGHT CONTROL APPARATUS AND ENDOSCOPE APPARATUS MAKING USE OF THE SAME

Katsuyoshi Sasagawa; Masao Uehara; Akinobu Uchikubo; Katsuyuki Saito; Masahide Kanno; Masahiko Sasaki; Takehiro Nakagawa, all of Hachioji; Jun Hasegawa, Mino, and Shinji Yamashita, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,718
Claims priority, application Japan, Jul. 28, 1988, 63-188870
Int. Cl.[5] H04N *7/18, 5/57*
U.S. Cl. 358—98 **11 Claims**

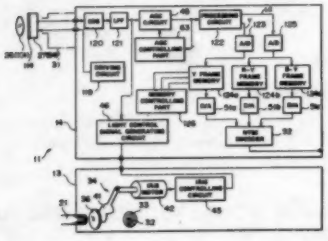
1. An endoscope automatic light control apparatus comprising:

an automatic light control means for controlling the quantity

of light incident to an imaging means for imaging an endoscopic image so as to maintain a signal from said imaging means substantially at a constant level;

an automatic gain control means for inputting the signal from said imaging means and for controlling its output level so as to maintain the signal substantially at a constant level;

said automatic light control means and said automatic gain control means respectively having a plurality of brightness information generating means for generating brightness information based on the signal from said imaging means, said plurality of brightness information generating means being different from each other in a method of generating brightness information, and one of said plurality of brightness information generating means able to be selected;



automatic light control means and said automatic gain control means respectively having a selecting means for selecting the brightness information generating means of the same method as said automatic light control means and as said automatic gain control means in said plurality of brightness information generating means;

said automatic light control means controlling the quantity of light based on said brightness information generated by said brightness information generating means selected by said selecting means; and

said automatic gain control means controlling the output level based on said brightness information generated by said brightness information means selected by said selecting means.

4,967,270

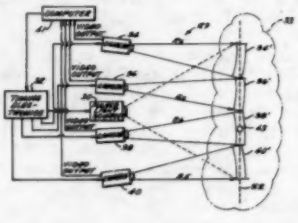
LIDAR SYSTEM INCORPORATING MULTIPLE CAMERAS FOR OBTAINING A PLURALITY OF SUBIMAGES

Bobby L. Ulich, Tucson, Ariz.; R. Norris Keeler, McLean, Va., and Kent Philbsen, Tucson, Ariz., assignors to Kaman Aerospace Corporation, Bloomfield, Conn.

Continuation-in-part of Ser. No. 348,746, May 8, 1989, abandoned. This application Jun. 12, 1989, Ser. No. 364,860

Int. Cl.[5] H04N 7/00

U.S. Cl. 358—95 **12 Claims**



1. An apparatus for detecting and imaging an object enveloped by a backscattering medium which is at least partially transmitting to light comprising:

generating means for selectively generating short pulses of light;

projecting means for projecting said short pulses of light toward the backscattering medium and at an object enveloped by the medium;

detecting means for detecting said pulses of light reflected back from said object after a time delay corresponding to the round-trip propagation time of said light pulses to and from said object; and

converting means for converting said detected pulses of light to a video image of said object;

wherein said detecting means further comprises;

a plurality of cameras directed laterally across a target image, each of said cameras obtaining a subimage of said target image;

time delay generator means for selectively gating each of said cameras after a predetermined time delay to produce variable time delay gating across said target image viewed by said cameras.

4,967,271

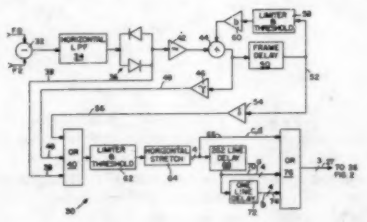
TELEVISION SCAN LINE DOUBLER INCLUDING TEMPORAL MEDIAN FILTER

Jack J. Campbell, San Francisco, Calif.; Yves C. Faroudja, 26959 Anacapa Dr., Los Altos, Calif. 94022, and Thomas C. Lyon, San Jose, Calif., assignors to Ives C. Faroudja, Los Altos Hills, Calif.

Division of Ser. No. 334,004, Apr. 5, 1989. This application Feb. 5, 1990, Ser. No. 464,009

Int. Cl.[5] H04N 7/18

U.S. Cl. 358—105 **6 Claims**



1. A motion detector for detecting motion at the vicinity of a spacial location i in a video picture and for putting out a motion detection value comprising:

first frame delay means for delaying an incoming pixel F0 by two fields to put a delayed pixel F2,

difference means for subtracting the amplitude of one of the F0 and F2 values from the amplitude of the other thereof and for putting out a difference value,

sign removal means for removing the sign of the difference value and for putting out an absolute value,

threshold means for establishing and passing the absolute value above a predetermined minimum threshold value,

horizontal stretch means for stretching the motion value over a predetermined number of pixels adjacent to the spacial location i and for providing an output to one input of an OR logic array,

field delay means connected to the output of the horizontal stretch means for delaying the stretched motion value by one field duration and for putting out the field delayed value to a second input of the OR logic array, and

line delay means connected to the output of the field delay means for delaying the field delayed, stretched motion value by one scan line period and for putting out the field and line delayed value (F1b) to a third input of the OR logic array,

the OR logic for selecting and putting out as the motion detection value the signal at any of its inputs having the greatest absolute magnitude.

4,967,272

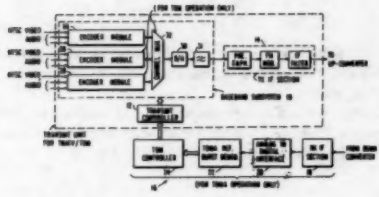
BANDWIDTH REDUCTION AND MULTIPLEXING OF MULTIPLE COMPONENT TV SIGNALS

Yih-Sien Kao, Gaithersburg, and Lin-nan Lee, Potomac, both of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Continuation of Ser. No. 149,039, Jan. 27, 1988, abandoned. This application Oct. 6, 1989, Ser. No. 418,993

Int. Cl.[5] H04N 7/12, 7/01, 7/04, 11/20

U.S. Cl. 358—135 32 Claims



1. A signal transmission system for processing at least portions of at least first and second video signals, each portion having first and second components, wherein the first component includes both a high frequency part and a low frequency part, transmitting the processed signal portions from a transmitting station to a receiving station and generating reconstructed video signal portions from said transmitted video signal portions at said receiving station, said system comprising:

first means at said transmitting station for reducing the baseband bandwidth of said first component of each of the first and second video signal portions by a first signal process to obtain processed first components for each of said first and second video signals;

second means at said transmitting station for reducing the baseband bandwidth of said second components of each of said first and second video signal portions by a second signal process different from said first signal process to obtain a processed second component for each of said first and second video signals; and

multiplexing means at said transmitting station for multiplexing the processed first and second components for said first and second video signals for transmission via a common carrier.

4,967,273

TELEVISION PROGRAM TRANSMISSION VERIFICATION METHOD AND APPARATUS

Burton Greenberg, New York, N.Y., assignor to VidCode, Inc., Wellesley, Mass.

Continuation of Ser. No. 10,974, Feb. 3, 1987, which is a continuation-in-part of Ser. No. 476,915, Mar. 21, 1983, Pat. No. 4,547,804, which is a continuation-in-part of Ser. No. 723,325, Apr. 15, 1985, which is a continuation-in-part of Ser. No. 786,983, Oct. 15, 1985, Pat. No. 4,639,779. This application Feb. 14, 1989, Ser. No. 311,146

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.[5] H04N 7/08

U.S. Cl. 358—142 6 Claims

1. A method for automatically identifying and verifying the airing of a television program which has a recurring identification code identifying the information content of the program recorded on a preselected line of the video portion of the program and which is transmitted as a composite signal from one or more sending stations at one or more times over one or more channels for reception in a receiving area, comprising the steps of:

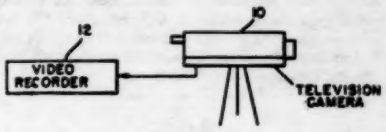
(a) receiving each of the composite signals of said one or more channels;

(b) detecting the reception of the composite signal of a program including said identification code and of an audio and video portion of each received composite signal which includes said identification code;

(c) separating the detected identification code from said received composite signal;

(d) generating an electrical time signal;

(e) generating a channel identifying signal;



(f) forming with said time signal and said channel identifying signal a separate verification signal for each separated identification code, said verification signal including information specifying the identify of said program and its time, duration and channel of reception;

(g) storing each said verification signal in a memory means to identify an airing of said program; and

(h) generating a report of airings of the program identified by said verification signal identifying said program and containing information concerning the time, duration and channel of such airings.

4,967,274

IMAGE DATA CONVERSION DEVICE

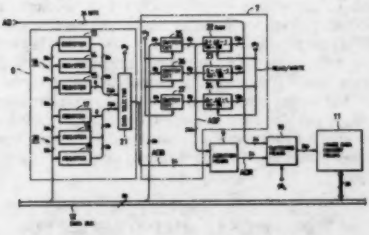
Fumihiro Sonoda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 3, 1988, Ser. No. 203,839

Claims priority, application Japan, Jun. 9, 1987, 62-142369

Int. Cl.[5] H04N 5/14

U.S. Cl. 358—160 8 Claims



1. An image processing system comprising a CPU and an image data conversion device which, while operating in a DMA transmission mode, can effect various image data conversions, said image data conversion device comprising:

image data memory means for storing picture element data and for outputting stored element data in response to a memory address signal;

a data bus for transmitting program address conversion data from the CPU only during a CPU program transmission mode and for receiving stored picture element data outputted from said image data memory means only during the DMA transmission mode, stored picture element data outputted by said image data memory means via said data

bus during the DMA transmission mode representing a reproduced image;

address output means for providing address data specifying memory addresses in said image data memory means in a predetermined order; and

conversion means coupled to said data bus for receiving program address conversion data during the CPU program transmission mode, said conversion means being selectively programmed according to the received program address conversion data for each operation in a DMA transmission mode, to effect, while operating in a DMA transmission mode, desired memory address conversions, said programmed conversion means supplying, during the DMA transmission mode and in response to address data provided by said address output means, a memory address which is different from the memory address specified by said address data to effect a desired image data conversion in accordance with the received program address conversion data.

4,967,275

TV RECEIVER HAVING A RF SIGNAL SPLITTER THAT SUPPLIES MORE SIGNAL ENERGY TO A FIRST TUNING CIRCUIT THAN TO THE SECOND SUBSTANTIALLY ACCORDING TO THE PICTURE DISPLAY RATIO OF THE FIRST AND SECOND TV PROGRAMS

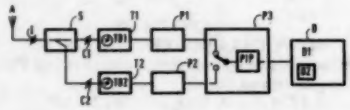
Willem J. Vogel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 30, 1989, Ser. No. 358,983

Claims priority, application Netherlands, Jun. 2, 1988, 8801413

Int. Cl.[5] H04N 5/45

U.S. Cl. 358—183 **2 Claims**



1. A TV receiver including an RF signal splitter coupled to an aerial input and having first and second RF signal terminals to which first and second tuning circuits for tuning to first and second TV programs, respectively, are connected, said first and second tuning circuits being connected via first and second TV-IF signal processing circuits to a device for displaying the picture of the second TV program in the picture of the first TV program, said RF signal splitter supplying more signal energy to the first tuning circuit than to the second, characterized in that the input dynamic range of the second tuning circuit, within which a substantially linear signal processing is possible, is smaller than that of the first tuning circuit.

4,967,276

VIDEO SIGNAL MIXING DEVICE FOR INFRARED/VISIBLE INTEGRATED IMAGING

Yoshishige Murakami; Kanji Hirota, and Masaaki Nakamura, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 24, 1989, Ser. No. 356,199

Claims priority, application Japan, May 24, 1988, 63-127868

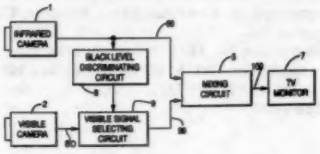
Int. Cl.[5] H04N 5/272, 5/33

U.S. Cl. 358—183 **13 Claims**

1. A video signal mixing device for superimposing a visible video signal output from a visible camera and an infrared video signal output from an infrared camera, both said cameras being focused on a common object, said video signal mixing device comprising:

a black level discriminating circuit for discriminating a first part of said infrared video signal lower than a predetermined black level from a second part of said infrared video signal higher than said predetermined black level;

a visible video selecting circuit for enabling output of said visible video signal during the presence of said first part of said infrared video signal lower than said predetermined black level, and selectively disabling output of said visible



video signal during the presence of said second part of said infrared video signal higher than said predetermined black level; and

a mixing circuit for superimposing said visible video signal, output from said visible video selecting circuit, and said infrared video signal.

4,967,277

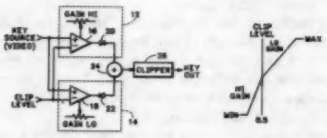
NON-LINEAR KEYER

Daniel J. Chaplin, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Oct. 6, 1989, Ser. No. 418,354

Int. Cl.[5] H04N 5/22

U.S. Cl. 358—183 **4 Claims**



1. A non-linea. keyer having a key source video signal and a clip signal as inputs comprising:

means for separating a key transfer function into two pieces, one piece being applied to values of the key source video signal above the clip signal and the other piece being applied to values of the key source video signal below the clip signal;

means for independently varying the slope of the transfer function for each piece; and

means for combining the two pieces to form a desired non-linear transfer function for the key source video signal.

4. A method of generating a non-linear transfer function for a key signal generator having a key source video signal and a clip signal as inputs comprising the steps of:

separating a key transfer function into two pieces, one above the clip signal and the other below the clip signal;

independently varying the slope of each piece of the key transfer function; and

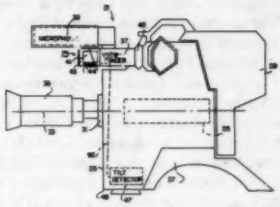
combining the two pieces of the key transfer function to produce the non-linear transfer function.

4,967,278

VIDEO CAMERA WITH A TRANSVERSE TILT DETECTOR AND INDICATOR COMPRISING AN ORDERED ARRAY OF LIGHT-EMITTING DIODES

Steve Greenbaum, 673 E. Eighth St., South Boston, Mass. 02127

Filed Aug. 8, 1988, Ser. No. 229,251
Int. Cl.[5] H04N 5/225
U.S. Cl. 358—224 8 Claims



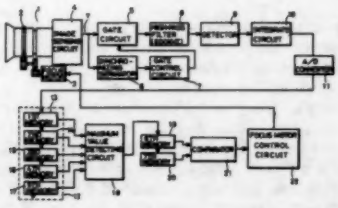
1. In a video camera comprising an optical-to-electronic image conversion means having a longitudinal optical axis and a viewfinder cooperating with said conversion means, the improvement comprising (A) a detector in said camera for detecting the transverse tilt of said camera in one of a plurality of successive angular increments, and (B) a plurality of light-emitting diodes arranged in an ordered array, said light-emitting diodes being responsive to said detector to indicate the transverse tilt of the camera in one of said detected angular increments, said light-emitting diodes being viewable in said viewfinder.

4,967,279

AUTOMATIC FOCUSING CIRCUIT

Hirotsugu Murashima, 8-6 Katashio-cho, Yamatotakada-shi, Nara-ken, Japan

Filed Jun. 5, 1987, Ser. No. 58,910
Claims priority, application Japan, Jun. 13, 1986, 81-138910
Int. Cl.[5] H04N 5/232; G03B 3/00
U.S. Cl. 358—227 38 Claims



1. An automatic focusing circuit for automatically matching the focus in response to a video signal obtained from an image sensor, comprising:

focus evaluating value detecting means for detecting a level of a high frequency component of the video signal obtained from the image sensor every constant period, converting the level into a focus evaluating value which takes the maximum value in the in-focus position or a focus evaluating value which takes the minimum value in the in-focus position, and sequentially supplying the same,

first holding means connected to said focus evaluating value detecting means for holding a plurality of focus evaluating values successively obtained every said constant period,

maximum value/minimum value detecting means for detecting the maximum value or the minimum value of said plurality of successively focus evaluating values held in said first holding means, and

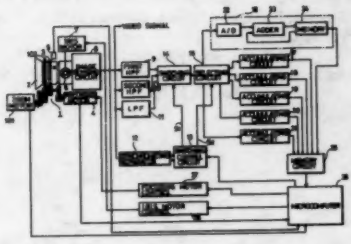
focus controlling means responsive to an output of said maximum value/minimum value detecting means for controlling the focus.

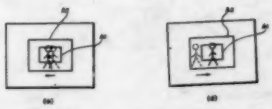
4,967,280

IMAGE SENSING APPARATUS HAVING AUTOMATIC FOCUSING FUNCTION OF AUTOMATICALLY MATCHING FOCUS IN RESPONSE TO VIDEO SIGNAL

Masao Takuma, Toyonaka; Toshinobu Haruki, Shijonawate, and Kenichi Kikuchi, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Continuation of Ser. No. 348,429, May 5, 1989, abandoned. This application Feb. 7, 1990, Ser. No. 478,061
Claims priority, application Japan, May 11, 1988, 63-113826; Jun. 8, 1988, 63-141290; Oct. 25, 1988, 63-268984
Int. Cl.[5] H04N 5/232
U.S. Cl. 358—227 23 Claims





1. An image sensing apparatus for automatically matching the focus relative to an object, comprising:

image sensing means (2, 8) having a focusing lens and an image sensor for generating a video signal in response to light incident from said object,

relative position changing means (3, 4) for changing a relative position in the direction of an optical axis of said focusing lens relative to said image sensor,

first focus evaluating value detecting means (9, 13, 14, 16) for detecting every constant time period a level of a first high frequency component in said video signal to supply the same as a first focus evaluating value,

second focus evaluating value detecting means (10, 13, 14, 16) for detecting every constant time period a level of a second high frequency component including a component at a frequency which is lower than the frequency of said first high frequency component in said video signal to supply the same as a second focus evaluating value,

each of said first and second focus evaluating values being a focus evaluating value which reaches the maximum value in an in-focus position,

means (26) for detecting a true focus evaluating value to

supply the same based on at least one of said first and second focus evaluating values,

relative ratio calculating means (26) for calculating a relative ratio of said first and second focus evaluating values,

in-focus state control means (26) for carrying out an automatic focusing operation for controlling said relative position changing means based on said true focus evaluating value so as to fix the relative position of said focusing lens to a position where said true focus evaluating value reaches the maximum value, and

means (26) for comparing said relative ratio with a reference value to allow resumption of the automatic focusing operation by said in-focus state control means only when said relative ratio is said reference value or less after the relative position of said focusing lens is fixed once to a position where said focus evaluating value reaches the maximum value.

4,967,281

CAMERA WITH EXCHANGEABLE LENS DEVICE REMOVABLY MOUNTED ON A CAMERA BODY

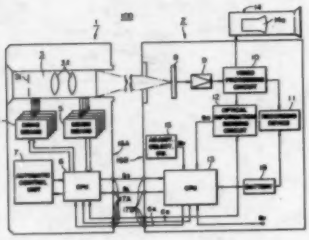
Shinji Takada, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 301,597

Claims priority, application Japan, Feb. 26, 1988, 63-42274

Int. Cl.[5] H04M *3/14*

U.S. Cl. 358—229 **18 Claims**



1. An exchangeable lens device comprising:

a housing adapted for removable mounting on a camera body;

imaging lens means contained within said housing and having elements which are controllable for adjusting respective functions thereof;

drive means for each of said functions also contained within said housing and being operative to drive the respective controllable elements;

sensing means contained within said housing for sensing positions of said controllable elements established by the respective drive means and providing corresponding position information; and

signal processing means contained within said housing and operative to control said drive means in response to position control signals applied from outside of said housing, and to provide sensed position signals to the outside of the housing in response to said position information.

4,967,282

WEARABLE DEVICE FOR THE SUPPORT OF A PORTABLE TELECAMERA

Enzo Malavasi, Via Calatafimi, 15, Varese, Italy

Filed Sep. 15, 1989, Ser. No. 407,526

Claims priority, application Italy, Jan. 13, 1989, 60901/89[U]

Int. Cl.[5] H04N *5/30*; A45F *3/08*; G03B *29/00, 17/00*

U.S. Cl. 358—229 **6 Claims**

1. A device to be worn by an operator for supporting a portable telecamera characterized by the fact that it is constituted by at last a first member, a second member and a third member:

the first member being constituted by a rigid wearable structure forming a frame of rectangular shape of adjustable dimensions according to the size of the operator provided with means for support and flexible elements to be attached to the body of the operator and a rigid element (10) adapted to support the second member;

the second member comprising three structures of which:

(1) the first structure consists essentially of a longitudinal rigid element (11) connected at one end to the rigid support element (10) of said first member by coupling means which permit freedom of rotation according to a vertical axis;

(2) the second structure consists of a rigid element generally in the shape of an elongated box (12) connected to the other end of said first element (11) by coupling means with freedom of rotation around a vertical axis;

(3) the third structure consists of a lever (13) which has its fulcrum in said second structure by means of coupling means with freedom of rotation around a horizontal axis, said third structure being provided at one end with suspension elements for suspending the third member, and at the other end with balancing elements (38, 38'), said balancing element acting between the third and the second structure and being capable of balancing said

lever independently from its inclination after the third member has been suspended at said ore end;

the third member consisting of:

(1) a longitudinal rigid element (44);

(2) means for fixing the telecamera in the upper part thereof;

(3) supporting means for said longitudinal element connected thereto in a manner capable of permitting the free rotation of said longitudinal element with respect to its vertical axis, and being capable of cooperating with the suspension elements of said third structure of the second member whereby a suspension of cardanic joint tipe of the third member is achieved, said supporting means comprising also a breaking element capable of maintaining the orientation of said longitudinal rigid element (44), capable of maintaining the telecamera oriented with respect to the operator and capable of deadening the motions of rotation of said longitudinal element around its vertical axis, said motions of rotations being manually carried out by the operator;

(4) at least one counterweight capable of maintaining the verticality of said longitudinal rigid element (44) and the horizontality of said telecamera after the latter has been fixed on said rigid longitudinal element and after said rigid longitudinal element has been suspended on the e suspension elements of said third structuread of said second member.

4,967,283

MULTICOLOR SUBLIMATION TYPE THERMAL RECORDING METHOD INCLUDING COLOR AND GRADATION CORRECTION AND DEVICE THEREFOR

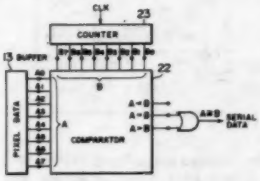
Takeshi Uchiyama, Tokyo; Yuji Homma, Tsurugashima; Tetsuya Sakamoto, Tokyo; Satoru Horiguchi, Tokyo; Mikizo Mizuno, Tokyo, and Hiroyuki Obata, Tokyo, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Continuation of Ser. No. 874,648, Jun. 16, 1986, Pat. No. 4,814,891. This application Nov. 17, 1988, Ser. No. 272,326

Claims priority, application Japan, Jun. 14, 1985, 60-129659; Aug. 6, 1985, 60-173028; Aug. 6, 1985, 60-173029; Sep. 18, 1985, 60-206060; Feb. 12, 1986, 61-28239; Feb. 20, 1986, 61-36150; Mar. 10, 1986, 61-52105

Int. Cl.[5] H04N *1/23;* G01D *15/10;* B41J *2/355;* H03M *9/00*

U.S. Cl. 358—296 1 Claim



1. A thermal transfer printer, comprising:

a converter having a buffer to which pixel data is input;

a counter to which a clock signal is input;

a comparator to which two multi-bit outputs of said buffer and said counter are input, whereby said comparator compares said multi-bit outputs to produce a serial data, for converting data per each color from said storage unit into serial data; and

a printing unit comprising heating elements, a shift register responsive to said serial data delivered thereto to produce parallel signals, a latch circuit for latching said parallel signals provided by said shift register, and a NAND circuit including a plurality of NAND gates each having two input terminals to one of which terminals latched parallel signals from said latched circuit are applied and to the other of which terminals a strobe signal is applied for delivering said latched parallel signals to said heat elements to effect thermal transfer from a transfer sheet to an image-receiving paper.

4,967,284

IMAGE FORMING APPARATUS AND METHOD OF CONTROLLING OUTPUT OF SEMICONDUCTOR LASER

Yoshiki Yoshida, Yokohama; Kenichirou Asada, Tokyo, and Kiyoto Nagasawa, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,599

Claims priority, application Japan, Oct. 19, 1987, 62-261656; Oct. 30, 1987, 62-274791; Oct. 30, 1987, 62-274792; Nov. 6, 1987, 62-279327; Aug. 24, 1988, 63-208032

Int. Cl.[5] G01D *15/16;* H04N *1/21*

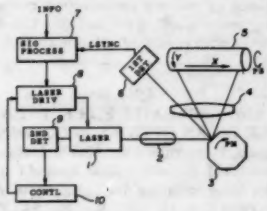
U.S. Cl. 358—300 16 Claims

12. A method of controlling laser power of a laser beam emitted from a semiconductor laser of an image forming apparatus which comprises imaging means including a photosensitive body and scanning means for scanning the photosensitive body by a spot of the laser beam on the photosensitive body so as to form an electrostatic image on the photosensitive body, said spot repeatedly scanning said photosensitive body in a main scanning direction along a sub scanning direction, said method comprising the steps of:

detecting an intensity of the laser beam emitted from said semiconductor laser;

comparing the detected intensity of the laser beam with a reference value; and

controlling the laser power of the laser beam emitted from said semiconductor laser to maintain said power approximately constant depending on a compared result, said compared result being derived with a timing determined



by a first signal which is generated with a predetermined period during the scanning in the sub scanning direction of a margin region of said photosensitive body immediatly before a second signal indicating the scanning of an effective image forming region of the photosensitive body in the sub scanning direction.

4,967,285

METHOD OF COMPENSATING FOR BACKLASH CAUSED AFTER CUTTING OFF RECORDING PAPER ON FACSIMILE APPARATUS

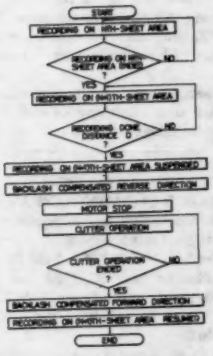
Hiroshi Tabuchi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1989, Ser. No. 434,001

Claims priority, application Japan, Dec. 5, 1988, 63-307302

Int. Cl.[5] H04N *1/23;* B23D *25/00;* B26D *5/00;* B23Q *15/00*

U.S. Cl. 358—304 5 Claims



1. A method of cutting off recording paper on a facsimile apparatus in which the torque of an electric motor is transmitted to a platen roller through a gear train so that said roller is rotated at a lower speed than said motor; a recording head, which is located in contact with said roller at one end of said head-under prescribed pressure and has a recording portion at said end in the face of said roller, records information on a portion of said paper wound as a roll; and said portion of said paper is thereafter cut off from the other portion thereof by a cutter, comprising the following steps:

a. transmitting the torque of said motor to said roller through said gear train so that the recording on an (n+1)th-sheet area of said paper is performed continuously after the recording on an nth-sheet area;

b. temporarily stopping said recording on said (n+1)th-sheet

when the boundary between said nth-sheet area and said (n+1)th-sheet area has reached a cutoff position;

c. compensating for backlash of said gear train caused in the temporary stoppage step by rotating said motor backward;

d. cutting said nth-sheet area from said (n+1)th-sheet area by said cutter;

e. compensating for backlash of said gear train caused in the cutting step by rotating said motor forward; and

f. resuming said recording on said (n+1)th-sheet area synchronously with resuming rotation of said roller.

4,967,286

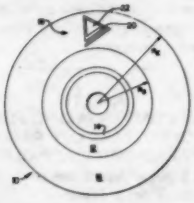
METHOD AND APPARATUS FOR FORMING A DIGITAL IMAGE ON AN OPTICAL RECORDING DISC

Ram R. Nomula, Huntsville, Ala.; Alan B. Hamersley, Anaheim, and Gordon Rudd, Woodland Hills, both of Calif., assignors to Disctronics Manufacturing, Inc., Huntsville, Ala.

Filed Dec. 12, 1988, Ser. No. 283,375

Int. Cl.[5] G11B 7/00

U.S. Cl. 358—342 **15 Claims**



1. A method for providing a graphical image on an optical recording disc comprising the following steps:

(a) storing a digital image in a first coordinate system as a first array of bits in a digital memory;

(b) transforming the digital image from the first coordinate system to an angular coordinate system to generate a second array of bits and storing the second array of bits; and

(c) using the second array of bits to modulate a writing beam in an optical disc mastering process to write the transformed digital image onto an optical recording disc.

4,967,287

IMAGE FORMING APPARATUS

Keiji Nakatani, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 313,095, Feb. 21, 1989, abandoned. This application Mar. 30, 1990, Ser. No. 504,095

Claims priority, application Japan, Feb. 25, 1988, 63-42957

Int. Cl.[5] H04N 1/04, 1/00

U.S. Cl. 358—401 **8 Claims**

1. An image forming apparatus comprising:

an electrophotographic process means including a photoconductor medium and process devices arranged around said photoconductor medium, said electrophotographic process means producing a copy corresponding to an image of a document projected onto said photoconductor medium;

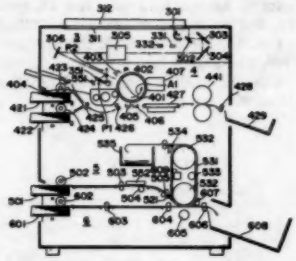
an image reading means for reading an image of a document so as to output digital data corresponding to the image;

a scan means for scanning a document so as to project an image of the document onto said photoconductor medium or said image reading means, said scan means including a change-over means for changing over an optical path of the document image so as to cause the image to be directed either to the photoconductor medium or to said image reading means;

a master forming means for forming a printing master according to the digital data outputted from said image reading means;

a printing means for printing a copy of the document by using the printing master formed by said master forming means;

a mode determining means for determining that either a first mode for activating said electrophotographic process



means, or a second mode for activating said image reading means, said master forming means and said printing means, is executed; and

a control means for controlling said scan means so as to scan the document at a first scan speed in the first mode, and at a second scan speed which is different from the first scan speed in the second mode, according to the mode determined by said mode determining means.

4,967,288

FACSIMILE STORAGE AND EXCHANGE SYSTEM

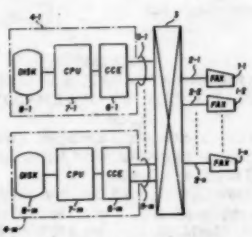
Youichi Mizutori, Tokyo, and Takanori Sasaki, Iida, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 29, 1988, Ser. No. 187,773

Claims priority, application Japan, May 1, 1987, 62-108660; Sep. 28, 1987, 62-240850

Int. Cl.[5] H04N 1/32

U.S. Cl. 358—425 **18 Claims**



1. A load distributing apparatus for a facsimile storage and exchange system comprising:

a plurality of facsimile units, each connected to respective ones of first lines, for transmitting and receiving information through said first lines;

a plurality of facsimile storage and exchange units, each including:

a communication control means connected to a plurality of second lines, for receiving image information and address information from one of said plurality of facsimile units through one of said second lines, and for transmitting said image information to at least another one of

said facsimile units designated by said address information,

storage means for storing said received image and address information until said received image information is transmitted, and

a central control means for controlling said communication control means and said storage means; and

a communication exchange network for connecting said first lines to said second lines so as to enable transmission and reception of information between said facsimile units and said facsimile storage and exchange units, and for interconnecting said second lines so as to enable transmission and reception among said facsimile storage and exchange units;

wherein said central control means includes:

means for calculating a quantity of image information load to be processed in connection with communication of said image information stored in said storage means,

means for generating supervision information indicative of the quantity of image information load to be processed, for transmitting said supervision information generated at the facsimile storage and exchange unit containing the generating means via said communication exchange network to another facsimile storage and exchange unit and for receiving supervision information generated at said another facsimile storage and exchange unit via said communication exchange network, and

means for exchanging means information and address information among said facsimile storage and exchange units via said communication exchange network so that the quantity of image information load to be processed indicated by said supervision information for each of said facsimile storage and exchange units may be balanced.

4,967,289

PCM SIGNAL RECORDING APPARATUS

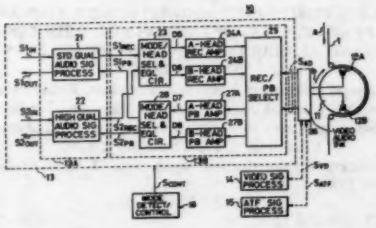
Keiji Kanota, Kanagawa, and Noboru Murabayashi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,399

Claims priority, application Japan, Sep. 30, 1987, 62-246917; Oct. 5, 1987, 62-251109

Int. Cl.[5] G11B *5/09, 5/02*

U.S. Cl. 360—46 **14 Claims**



1. An apparatus for recording an analog video information signal and a digital audio information signal in parallel adjacent tracks on a magnetic recording medium, the analog video information signal including frequency modulated signal components having a predetermined frequency spectrum, and the digital audio information signal consisting of components having a peak in the frequency spectrum of the analog video information signal, said apparatus comprising:

at least a pair of rotary magnetic heads having air gaps with different azimuth angles for tracing the parallel adjacent tracks on said magnetic recording medium;

first and second recording signal forming circuits selectively operative for forming the digital audio information signal, said first recording signal forming circuit forming a recording signal having a standard recording density for a standard quality recording and further having a central spectrum component substantially the same as a recordable frequency spectrum component of said frequency-modulated analog video information signal, and said second recording signal forming circuit forming a recording signal having a recording density higher than said standard recording density for a higher quality recording and further having a central spectrum component in a frequency band lower than the frequency band of said central spectrum component of said recording signal having the standard recording density;

recording amplifier means for supplying the recording signal from a selected one of said first and second recording signal forming circuits to said pair of rotary magnetic heads with a recording current which is selectively variable; and

means for selectively varying said recording current from said recording amplifier means depending on whether said recording signal is selected from said first or second recording signal forming circuit so as to have said standard recording density or the higher recording density, respectively.

4,967,290

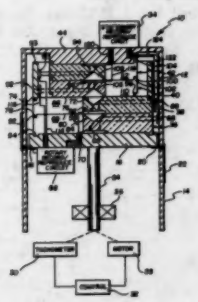
MULTIPLE CHANNEL ROTARY MAGNETIC HEAD SCANNER HAVING STACKABLE ELECTRO-OPTICAL SIGNAL TRANSMISSION MODULES

Frederic F. Grant, Bellflower, and John Grant, Downey, both of Calif., assignors to Datatape Incorporated

Filed Aug. 26, 1988, Ser. No. 236,866

Int. Cl.[5] G11B *15/14*; G02B *6/26*

U.S. Cl. 360—64 **7 Claims**



1. An electro-optical signal transmission module comprising:

a generally cylindrical body having a radiation transmissive cylindrical wall and upper and lower generally circular walls;

a radiation receiving device centrally mounted on one of said upper and lower walls;

an inwardly directed, conically-shaped reflective surface disposed on the other of said upper and lower walls, opposite said radiation receiving device, such that an optical signal radially transmitted through said radiation transmissive wall of said body is reflected from said reflective surface onto said radiation receiving device; and

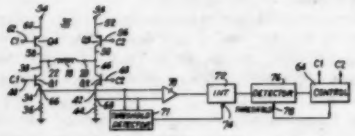
complementary mating means respectively provided on said upper and lower walls of said body for mating a plurality of said bodies into a stack.

4,967,291

METHOD AND APPARATUS FOR PREVENTING AN OVER-VELOCITY ERROR CONDITION OF A HARD DISK DRIVE SYSTEM

James J. Touchton, Boulder, and Todd D. Baumann, Berthoud, both of Colo., assignors to MiniScribe Corporation, Longmont, Colo.

Filed Nov. 2, 1988, Ser. No. 266,127
Int. Cl.[5] G11B 5/55
U.S. Cl. 360—78.04 17 Claims



15. A method for preventing an over-velocity error condition of a hard disk drive system in which a head actuator is driven by a voice coil motor in response to a current supplied through the latter, to carry out a track access operation, an integrated value of said current being indicative of a contemporaneous velocity of said head actuator, said method comprising the steps of:

providing an integrated value of said current;

maintaining said integrated value at an initial reset value while current flows through said motor until said current through said motor exceeds a predetermined threshold level whereafter said current is integrated; and

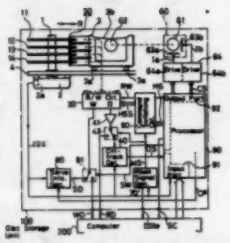
interrupting the supply of current through said voice coil motor in response to a detection that said integrated value exceeds a velocity threshold value.

4,967,292

HEAD POSITION CONTROLLER FOR A DISC STORAGE UNIT

Eiji Moteki, Kawasaki, Japan, assignor to Fuji Electric Company, Ltd., Kanagawa, Japan

Filed Jul. 2, 1987, Ser. No. 69,439
Claims priority, application Japan, Jul. 8, 1986, 61-160420
Int. Cl.[5] G11B 5/55, 5/596
U.S. Cl. 360—78.13 1 Claim



1. A head position controller for a disc storage unit comprising:

a plurality of discs having a plurality of major disc surfaces, each of said plurality of major disc surfaces having tracks for recording information, said tracks being provided on each of said major disc surfaces of each of said plurality of discs, and each of said plurality of discs being rotatably mounted on a common shaft;

a spindle motor for driving said discs to rotate;

an index pulse generator which is mounted on said spindle motor, for producing an index pulse corresponding to a predetermined rotation angle of said spindle motor;

a plurality of heads, each of which is disposed adjacent to a respective one of said major disc surfaces so that each of said plurality of read/write heads corresponds to a respective one of said major disc surfaces to read out/write the information from/into the corresponding said major surface;

a two-phase type stepping motor for displacing said plurality of heads in a radial direction relative to each of said discs, each of said plurality of heads being displaceable relative to respective track positions corresponding to positions of said tracks, as well as along respective reference positions corresponding to positions of servo information for detecting an off-track amount of said heads with respect to a center line of each of said tracks;

a stepping motor drive circuit for controlling each phase current of said two-phase type stepping motor;

a read/write circuit for reading out/writing said information into/from said major surface of a selected one of said plurality of discs by selection of a determined one of said plurality of heads in response to a head selection command;

servo information writing means for writing said servo information into each of said major surfaces of said plurality of discs, via said read/write circuit and said determined one of said plurality of heads in synchronism with said index pulse when said servo information is written, after said stepping motor has been driven to move to said reference position by means of said stepping motor drive circuit;

off-track detecting means for reading out said servo information on said major surface of said selected one of said plurality of discs in response to said index pulse by said read/write circuit, and detecting an off-track amount in accordance with the servo information read-out; and

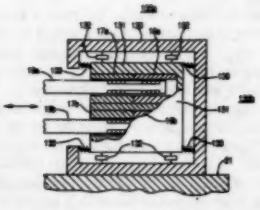
head position correcting means for outputting said head selection command to read out/write said information into/from said read/write circuit when said information from/to said track is read out, said head position correcting means then causing said stepping motor to be driven to move to a desired track position by means of said stepping motor drive circuit, whereupon said head position is corrected by said stepping motor drive circuit in accordance with said off-track amount detected by said off-track detection means.

4,967,293

MULTI-POSITIONER MAGNETIC DISK STORAGE APPARATUS HAVING MEANS FOR REDUCING MECHANICAL VIBRATION INTERFERENCE BETWEEN POSITIONERS

Keiji Aruga, Hiratsuka; Yoshifumi Mizoshita, Tama; Masahito Iwatsubo, Kawasaki, and Toshifumi Hatagami, Machida, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 5, 1988, Ser. No. 228,942
Claims priority, application Japan, Aug. 11, 1987, 62-201515; Sep. 14, 1987, 62-230568
Int. Cl.[5] G11B 5/55
U.S. Cl. 360—78.12 35 Claims



1. A magnetic disk storage apparatus comprising:

a magnetic disk assembly including:

a plurality of magnetic disks;

a plurality of magnetic head positioners, each of said magnetic head positioners including driving means and each of said magnetic head positioners being driven by said driving means independently of each other to position a magnetic head supported by each of said magnetic head positioners over a surface of said magnetic disks; and

a housing enclosing said magnetic head positioners and said magnetic disks and securing said magnetic head positioners thereto;

mechanical vibration follow-up system means for reducing interference of mechanical vibration caused by a start of seek operation of a first one of said magnetic head positioners and partially transferred through said housing and imposed on a second one of said magnetic head positioners which is not secured, said mechanical vibration follow-up system means, including:

sensor means, coupled to said housing, for sensing mechanical vibration of the housing in an access direction and outputting a sense current; and

signal processing circuit means, operatively connected to said sensor means and to said driving means, for receiving the sense current, generating a compensating signal proportional to the sense current for following up the mechanical vibration, and outputting the compensating signal to said driving means for driving a second one of said magnetic head positioners for compensating any off-track caused by mechanical vibration of said housing of a magnetic head supported by said second one of said magnetic head positioners.

4,967,294

MAGNETIC RECORDING/REPRODUCING DEVICE WHICH DISCRIMINATES RECORDED AND UNRECORDED TRACKS

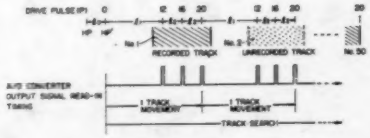
Kiyotaka Kaneko; Izumi Miyake; Yoshio Nakane, and Hiroshi Shimaya, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 31, 1988, Ser. No. 238,850

Claims priority, application Japan, Aug. 31, 1987, 62-217729

Int. Cl.[5] G11B *5/55*

U.S. Cl. 360—78.13 **11 Claims**



1. A track search device in a magnetic recording/reproducing apparatus for performing a track search in which a magnetic head is moved over each track formed in a magnetic recording medium, such as a magnetic disc or the like, and which determines if a track accessed by a magnetic head is a recorded track or an unrecorded track in accordance with signals output from the magnetic head while it is moved, the track search device comprising:

head moving means for moving the magnetic head in the radial direction of the magnetic recording medium from a predetermined position set on the magnetic recording medium;

an envelope detecting circuit for envelope detecting signals output from the magnetic head;

input means for inputting the output signal of said envelope detecting circuit to a decision means each time the magnetic head is moved by said head moving means to each of a plurality of different positions within a predetermined track width of a track to be accessed based on said predetermined position,

said decision means determining that an accessed track is a recorded track when at least one of a plurality of signals input from said inputs means respectively corresponding to said plurality of different positions exceeds a predetermined threshold value, and for determining that an accessed track is an un-recorded track when all of said plurality of signals are less than said predetermined threshold value; and

storage means for storing the decision results of said decision means for each track.

4,967,295

HUMIDITY REGULATING APPARATUS FOR MAGNETIC DISK DRIVE

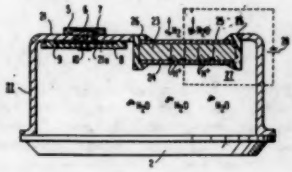
Shiro Yamauchi; Naotake Rito, and Nobuyoshi Takahashi, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,837

Claims priority, application Japan, Jun. 8, 1987, 62-142720; Oct. 9, 1987, 62-255360

Int. Cl.[5] G11B *5/012*

U.S. Cl. 360—97.02 **8 Claims**



1. A humidity regulating apparatus comprising:

a semi-sealed partly air-permeable container having an opening in a walled thereof;

a hydrogen ion conductor provided in the opening, aid conductor comprising a solid electrolyte and having an inner surface facing an interior of said container and an outer surface facing toward outside air;

a first porous film-like electrode that is bonded to the inner surface of said hydrogen ion conductor;

a second porous film-like electrode that is bonded to the outer surface of said hydrogen ion conductor;

insulating material for electrically insulating said hydrogen ion conductor, and said first and second electrodes from said semisealed type container, said insulating material sealing said opening; and

a first power supply for impressing a first DC voltage across said first and second electrodes so as to induce an electrolytic reaction in said hydrogen ion conductor for regulating humidity within said container.

4,967,296

LIGHTWEIGHT, RIGID, COMPACT CONFIGURATION FOR THE VOICE COIL, CARRIAGE AND PRINTED CIRCUIT CABLE IN A DISC DRIVE

John P. Wiens; Mark W. Pollard, and John O. Weinberg, all of Santa Clara County, Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

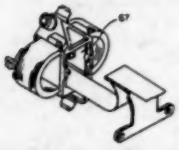
Continuation of Ser. No. 112,021, Oct. 8, 1987, abandoned, which is a continuation of Ser. No. 800,059, Nov. 20, 1985, abandoned. This application Mar. 14, 1989, Ser. No. 325,127

Int. Cl.[5] G11B *5/55*

U.S. Cl. 360—106 **20 Claims**

1. In a magnetic disc memory storage apparatus including a base, spindle means mounted to the base for rotation of a plurality of discs, a transducer, array for accessing information

magnetically recorded on each disc, and an actuator assembly for moving the transducer array along a straight radial path to spaced track locations on each disc, comprising a carriage, means adjacent the rotating discs for guiding the carriage for movement along a desired linear path of travel relative to the discs comprising upper and lower rails arrayed along said linear path, a pair of symmetrically disposed motor sections, one section on each side of said path, said carriage comprising a rectangular framework comprising at least four upright posts joined together by a base and a top to form said rectangular carriage framework, bearing means coupling the carriage to the guide means for travel on said linear path said bearing means comprising three pairs of bearings, two of said pairs of bearings engaging one of said rails and preceding and following said rectangular framework, and said third pair of bearings engaging the other of said rails and located adjacent the rectangular framework, and a single coil carried on said carriage in an orientation defined by said upright posts and aligned with the motor sections to drive the carriage along the path, said



single coil being mounted on and supported by the rectangular bobbin located within said rectangular framework of said carriage to define semi-cylindrical open voice coils extending on either side of the carriage arranged to pass over semi-cylindrical pole piece sections of said motor as the carriage passes between the motor sections, means for mounting said transducer array comprising a head mounting block attached to the lead surface of said rectangular framework, the carriage being generally symmetrical about a vertical plane through its center line, said carriage being shaped so that a center of gravity thereof is on said plane and midway between the pole pieces of said motor and midway between said rails for guiding said carriage so that forces used to linearly move said carriage are centralized in said carriage, said bobbin and said coil and said head mount block serving to maintain the shape of and provide structrual rigidity to said rectangular framework and form in combination with said rectangular framework an integrated carriage assembly with maximum structural stiffness and minimal moving mass.

4,967,297

MAGNETIC DISK HEAD POSITIONING DEVICE

Masao Okita; Shinichi Omori, and Ryu Yunokuchi, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,762

Claims priority, application Japan, Jan. 26, 1988, 63-13677; Feb. 3, 1988, 63-22070; Mar. 2, 1988, 63-47388

Int. Cl.[5] G11B *5/55*

U.S. Cl. 360—106 **6 Claims**

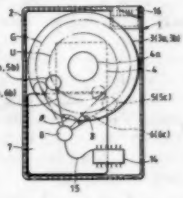
1. A magnetic disk driving device comprising:

a flexible disk-shaped magnetic recording medium having two sides and being disposed so that the medium can be rotated;

a pair of magnetic heads for recording information on and/or retrieving information from said magnetic recording medium during rotation of said magnetic recording medium; and

a pair of head holder plates disposed adjacent to said recording medium each supporting one of said magnetic heads, each of said head holder plates having a recess formed therein facing said recording medium and surrounding the magnetic head which it supports such that said magnetic head projects toward said magnetic recording medium from said recess,

wherein said head holder plates are described as aligned on opposite sides of said recording medium when a line perpendicular to a surface of a side of the magnetic recording medium passes through the recess or the magnetic head on



one side of the recording medium while at the same time passing through the recess or the magnetic head on an other side of the recording medium,

wherein said magnetic heads are located on opposite sides of said magnetic recording medium at positions such that said head holder plates are not aligned on opposite sides of said recording medium.

4,967,298

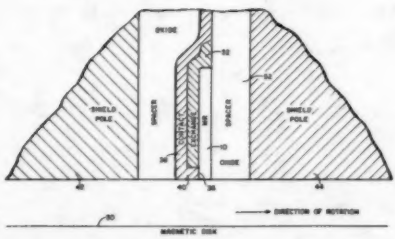
MAGNETIC HEAD WITH MAGNETORESISTIVE SENSOR, INDUCTIVE WRITE HEAD, AND SHIELD

Greg S. Mowry, 13905 James Ave. South, Burnsville, Minn. 55337

Division of Ser. No. 221,479, Jul. 19, 1988, Pat. No. 4,891,725, which is a continuation of Ser. No. 15,203, Feb. 17, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 414,941

Int. Cl.[5] G11B *5/39, 5/265*

U.S. Cl. 360—113 **5 Claims**



1. A magnetic head comprising:

an elongated magnetoresistive sensor strip having a sense region and exchange-biasing antiferromagnetic material exchange-coupled to the magnetoresistive sensor strip only outside the sense region, the sense region being stabilized in a single magnetic domain state through exchange interaction outside the sense region;

trailing and leading inductive write poles and a soft-magnetic shield forming first and second gaps, the first gap being between the poles and the second gap being between the trailing pole and the shield;

the elongated magnetoresistive sensor strip being mounted in the second gap;

the leading one of the poles having a length defining a track width;

the central sense region being approximately the same length as the leading pole; and

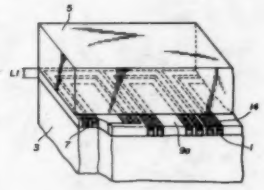
the trailing pole having a length at least as long as the elongated magnetoresistive sensor strip.

4,967,299

THIN-FILM MAGNETIC HEAD WITH A PLURALITY OF TRANSDUCERS

Takahiro Katoh; Toeru Takeura, both of Odawara; Masayoshi Waki; Yoshiki Hagiwara, both of Hadano, and Kazuyoshi Adachi, Yugawaramachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 23, 1988, Ser. No. 210,570
Claims priority, application Japan, Jun. 29, 1987, 62-159591
Int. Cl.[5] G11B *5/265, 5/33*
U.S. Cl. 360—121 8 Claims



1. A thin-film magnetic head having multi-track capability comprising:

a first ferrite block including a plurality of transducing elements formed atop a predetermined surface thereof; and

a second ferrite block, to be bonded to the predetermined surface of the first ferrite block;

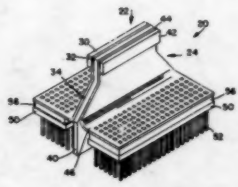
wherein either bonding surface of the first and second ferrite blocks includes an insulating film layer, and wherein a plurality of recesses, to be coated or externally fed with an adhesive, are formed on any entire bonding surface of the first and second ferrite blocks in such a manner that the adhesive is filled in gaps which are formed by the recesses and an opposing ferrite block surface.

4,967,300

MAGNETIC HEAD ASSEMBLY HAVING A TRANSVERSE GUIDING SURFACE FORMED OF A MIXTURE OF ALUMINUM OXIDE AND TITANIUM CARBIDE

James Reid, Santa Ynez; Gary E. Roberts, Santa Barbara, and Paul D. Frank, Goleta, all of Calif., assignors to Applied Magnetics Corporation, Goleta, Calif.

Filed Oct. 14, 1983, Ser. No. 542,052
Int. Cl.[5] G11B *5/187, 5/127*
U.S. Cl. 360—122 15 Claims



1. A transducer head sub-assembly having a transverse guiding surface which is highly resistant to being abraded by a recording medium for reading and recording magnetically recorded information on the recording medium comprising

a transducer having a transducing element at one end thereof and conductive leads of a known length extending therefrom at a different location than said one end;

a substrate formed of a mixture of sintered Al_2O_3—TiC having a medium contacting surface and a support surface extending substantially perpendicular therefrom, said substrate having said transducer rigidly affixed to said substrate supporting surface with the transducing element positioned adjacent said medium substrate contacting surface; and

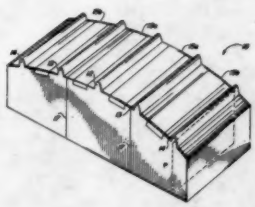
a spacer formed of a mixture of sintered Al_2O_3—TiC having substantially the same abrading characteristics as said substrate when contacted by a medium, said spacer having a medium contacting surface of a predetermined width and sidewalls extending substantially perpendicular therefrom a distance less than the known length of the conductive leads of the transducer, said spacer being rigidly affixed in an opposed, spaced relationship to said substrate supporting surface with said transducer located therebetween with the conductive leads of the transducer extending beyond the sidewalls forming a transducing head sub-assembly having said transducing element positioned between said substrate medium contacting surface and said spacer medium contacting surface to define a transverse guiding surface having substantially the same abrading characteristics thereacross adapted to be contacted by a recording medium transversing along a path which is substantially parallel to and in contact with said transverse guiding surface.

4,967,301

SHALLOW MAGNETIC HEAD SHIELD FOR REDUCING FEEDTHROUGH

Rudolph M. Lopez; James L. Nix, and Robert E. Weinstein, all of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 234,771, Aug. 22, 1988, abandoned.
This application May 9, 1990, Ser. No. 520,170
Int. Cl.[5] G11B *5/11*
U.S. Cl. 360—128 11 Claims



1. A magnetic head having a magnetic media-engaging surface comprising:

a write magnetic circuit including a write core having a write gap at said media-engaging surface;

a read magnetic circuit including a read core having a read gap at said media-engaging surface, said read gap parallel to said write gap; and

a soft magnetic shield between said write gap and said read gap at said tape-engaging surface, said shield of a length at least 80 percent of that of the longer of said write gap and said read gap at the media-engaging surface in the direction perpendicular to that of the tape movement, said shield of a depth no more than twice that of the deeper of said write gap and said read gap.

4,967,302

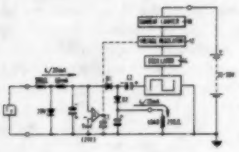
SAFETY BARRIERS FOR 2-WIRE TRANSMITTERS

Ian C. Hutcheon, Luton, and David J. Epton, Dunstable, both of England, assignors to Measurement Technology Limited, Bedfordshire, England

Filed May 31, 1988, Ser. No. 200,617
Claims priority, application United Kingdom, Jun. 2, 1987, 8712865
Int. Cl.[5] H02H *3/20*
U.S. Cl. 361—1 17 Claims

1. A safety barrier for energizing a two-wire transmitter, the

barrier including floating DC power supply means adapted to enable the barrier to deliver into a grounded load a direct current substantially equal to that which it draws from the transmitter, in which the floating DC power supply means is



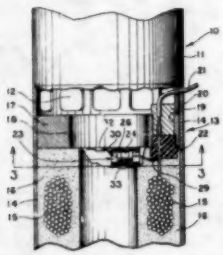
derived from an external DC source, with means to generate the floating power supply means being located within the barrier and comprising an oscillator, a voltage step-up transformer, and a rectifying and smoothing circuit.

4,967,303

SURGE SUPPRESSION SYSTEM FOR SUBMERSIBLE ELECTRICAL MOTORS

Frank U. Yuhasz, Ashland, Ohio, assignor to McNeil (Ohio) Corporation, St. Paul, Minn.

Filed May 15, 1989, Ser. No. 351,372
Int. Cl.[5] H02H 9/06
U.S. Cl. 361—23 **11 Claims**



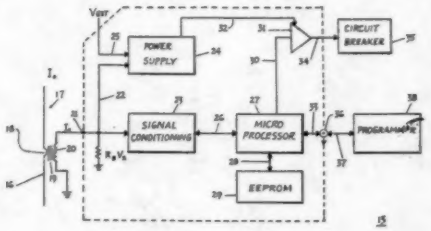
1. An electrically surge protected submersible motor comprising a housing in communication with electrical ground when the motor is submersed; an end ring in contact with said housing; stator windings within said housing and spaced from said end ring; power wires providing electrical power to said windings; surge protection means electrically connected between each said power wire and said end ring and positioned in the space between said end ring and said stator windings; and an insulating sleeve around each said surge protection means; each said surge protection means including a gas filled chamber, a first electrode in said chamber electrically connected to a said power wire, and a second electrode in said chamber spaced from said first electrode and electrically connected to said end ring; the conductivity of the gas in said chamber being such that at a predetermined voltage level in a said power wire, electrical current will be diverted from said windings and pass from said first electrode through said chamber to said second electrode and from said second electrode to said end ring and said housing.

4,967,304

DIGITAL CIRCUIT INTERRUPTER WITH ELECTRIC MOTOR TRIP PARAMETERS

John J. Dougherty, Avon, Conn., assignor to General Electric Company, New York, N.Y.

Filed Oct. 11, 1988, Ser. No. 256,357
Int. Cl.[5] H02H 5/00
U.S. Cl. 361—31 **11 Claims**



1. A digital circuit interrupter for electric motor protection comprising:

circuit current sensing means;

a signal conditioning circuit for converting circuit current to a corresponding voltage signal;

a signal processor connected with said signal conditioning circuit for comparing said corresponding voltage signal to calculate trip parameters and interrupting said circuit current when said corresponding voltage signal exceeds said calculated trip parameters; and

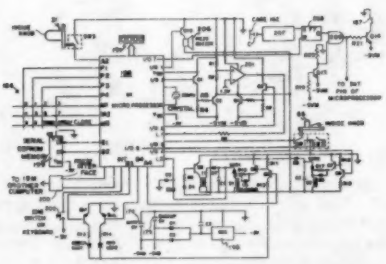
memory means connected with said signal processor, said memory means containing predetermined time and current data points corresponding to an electric motor protection profile and algorithm means for interpolating between said predetermined data points to provide said calculated trip parameters said algorithm means comprising a logarithmic interpolation algorithm.

4,967,305

ELECTRONIC DOOR LOCK APPARATUS, SYSTEM AND METHOD

Edward S. Murrer, Redwood City, and Mir A. Imran, Palo Alto, both of Calif., assignors to DataTrak, Inc., Mountain View, Calif.

Filed Jan. 6, 1989, Ser. No. 294,384
Int. Cl.[5] E05B 49/00, 47/00
U.S. Cl. 361—172 **19 Claims**



1. In an electronic door lock system free of externally accessible keyways for use with a door mounted in a door frame in which the door has an outside and an inside, the door frame having first and second recesses formed therein, a dead bolt mechanism adapted to be mounted on the door and having a dead bolt movable between a door latched position in which it

is disposed in the first recess in the door frame and door unlatched position in which the dead bolt is free of the first recess in the door frame, a latch mechanism adapted to be mounted on the door and having a latch movable between a door latched position in which it is disposed in the second recess in the door frame and a door unlatched position in which the latch is free of the second recess in the door frame, first and second hand-operated members adapted to be mounted on the outside of the door and adapted to be engaged by the human hand, first interconnecting means interconnecting said first hand-operated member to said dead bolt, second interconnecting means interconnecting said second hand-operated member to said latch for moving said latch between latched and unlatched positions, said first and second interconnecting means each including electrically operated means movable between a first operative position and a second inoperative position, a control unit adapted to be mounted on the door in the vicinity of said dead bolt mechanism and said latch mechanism said control unit including at least two batteries and electronic circuitry connected to said batteries and means electrically connecting the electronic circuitry of the control unit to the electrically operated means of the first and second interconnecting means, said control unit including means for selectively energizing the electrically operated means of the first and second interconnecting means so that said dead bolt and said latch can be moved to unlatched positions under the control of the first and second hand-operated members.

8. In an electronic door lock system for use with a door mounted in a door frame, the door frame having a recess formed therein, a latch mechanism adapted to be mounted on the door and having a latch movable between a door latching position in which it is disposed in the recess in the door frame and a door unlatched position in which the latch is free of the recess in the door frame, a member adapted to be engaged by the human hand, means interconnecting said member to said latch for moving said latch between latched and unlatched positions, said interconnecting means including means movable between a first operative position and a second inoperative position, a control unit adapted to be mounted on the door in the vicinity of said latch mechanism and including self-contained electronic circuitry and means for electrically connecting the electronic circuitry of the control unit to the electrically operated means of the latch mechanism, said electronic circuitry including a key pad assembly mounted on the door and means carried by the key pad assembly for illuminating the key pad assembly when the ambient light in the vicinity of the key pad assembly is inadequate to permit viewing of the key pad assembly, said means for illuminating the key pad assembly including a light pipe, a lamp for supplying light to the light pipe and a photo sensor for sensing ambient light and capacitive means adapted to be energized by the presence of a human hand to energize the lamp.

4,967,306

HIGH PURITY AROMATIC POLYESTERS

Edward F. Hampl, Jr., and Mohammad Iqbal, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 5, 1989, Ser. No. 348,262
Int. Cl.[5] H01G *4/08*; C08G *63/02*
U.S. Cl. 361—323 **9 Claims**

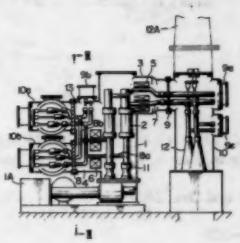
1. A film-wound capacitor including layers of film that comprises oligomer-free polyester consisting essentially of repeating interpolymerized units derived from isophthalic acid and/or terephthalic acid and 9,9-bis-(4-hydroxyphenyl)-fluorene interleaved with metallic conductor layers.

4,967,307

GAS INSULATED SWITCHGEAR APPARATUS

Syunji Itou; Yoshiro Suzuki, and Minoru Sakaguchi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 4, 1989, Ser. No. 293,452
Claims priority, application Japan, Jan. 11, 1988, 63-2592
Int. Cl.[5] H02B *1/04*
U.S. Cl. 361—335 **27 Claims**



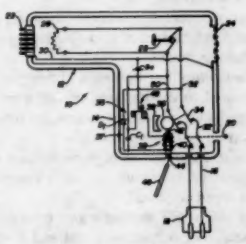
1. A gas-insulated switchgear apparatus comprising:
a barrel-type sealed enclosure having an insulated gas sealed therein;
breakers of three phases contained in said sealed enclosure;
a plurality of main buses each connected to at least one terminal of each of said breakers; and
a common casing on which said plurality of main buses are arranged and which is integrally formed on one side of said sealed enclosure and which extends in a longitudinal direction of said sealed enclosure;
said common casing being coupled to said main buses through a plurality of respective insulating spacers;
said common casing containing a plurality of connecting conductors a respective one of which connect a terminal of said breakers to said main buses.

4,967,308

ENHANCED SAFETY DEVICE FOR AN ELECTRICAL APPLIANCE

Milton Morse, One Horizon Rd., Fort Lee, N.J. 07024

Continuation-in-part of Ser. No. 310,225, Feb. 13, 1989. This application May 22, 1989, Ser. No. 355,195
Int. Cl.[5] H02H *3/16*
U.S. Cl. 361—42 **12 Claims**



1. A safety device adapted for use in an electrical appliance having an AC poer supply connected to a load by a first electrical path, comprising:
ground plane means disposed within said electrical device for providing a second electrical path;
electrical storage means for providing current through said ground plane means whenever said first electrical path is electrically connected to said ground plane means;
current interruption means, disposed within said electrical

device and responsive to said current provided by said electrical storage means, for electrically disconnecting the AC power supply from the first electrical path; and

power supply means for providing a source of operating potential to said current interruption means, said first power supply means being independent of the AC power supply, wherein said current interruption means can disconnect the AC power supply from the load before the AC power supply is connected to the load.

4,967,309

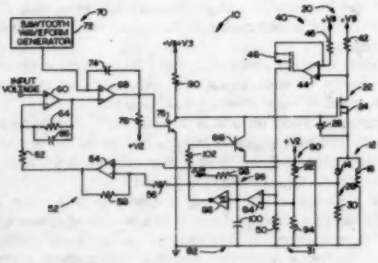
DUAL CURRENT SENSING DRIVER CIRCUIT

John P. Hoffman, Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Dec. 26, 1989, Ser. No. 456,918

Int. Cl.[5] G05F *1/575*

U.S. Cl. 361—160 **5 Claims**



1. A driver circuit for controllably connecting an inductive load to a source of electrical power, said inductive load having a reverse biased flyback diode connected in parallel with an inductive winding of a solenoid, comprising:

switching means for connecting and disconnecting said inductive load to and from said source in response to receiving a control signal;

flyback current sensing means for sensing the current flowing through said flyback diode and delivering a flyback signal having a magnitude responsive to the magnitude of said flyback current;

an energization current resistor connected between a positive reference terminal of said electrical power source and said switching means;

an operational amplifier having a non-inverting input terminal connected to the junction of said energization current resistor and said switching means, an inverting input terminal, and an output terminal;

a scaling resistor connected to between said electrical power source positive terminal and said operational amplifier inverting input terminal;

a p-channel MOSFET having a gate connected to said operational amplifier output terminal and a source connected to the junction of said operational amplifier inverting input terminal and said scaling resistor, said p-channel MOSFET being adapted to deliver a switching signal in response to the current flowing through said switching means;

control means for receiving said flyback and switching signals and delivering said control signal to said switching means at a preselected frequency and variable duty factor, said duty factor being responsive to the magnitude of said flyback and switching signals.

4,967,310

BREAK-AWAY ELEMENT FOR ELECTRICAL CAPACITOR

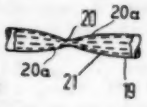
Werner Erhardt, Ballendorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 357,251

Claims priority, application Fed. Rep. of Germany, May 26, 1988, 3817903

Int. Cl.[5] H01G *1/13*

U.S. Cl. 361—275 **11 Claims**



1. In an electrical capacitor having a housing, an improved over-pressure break-away element composed of a malleably deformed wire having a rated break location with a smooth surface and a gradual continuous transition from a cross section of said wire to a cross section of said break location.

4,967,311

ELECTRONIC MODULE INTERCONNECTION SYSTEM

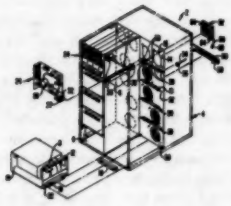
Joerg U. Ferchau, Morgan Hill; Hoa V. Pham, San Jose, and Randall J. Diaz, Gilroy, all of Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.

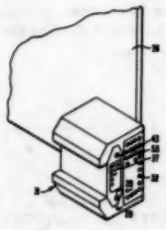
Division of Ser. No. 76,458, Jul. 22, 1987, Pat. No. 4,899,254.

This application Jul. 31, 1989, Ser. No. 387,662

Int. Cl.[5] H05K *1/14*

U.S. Cl. 361—395 **2 Claims**





1. An electronic system of the type including an electronic module coupled to a power supply and to signal lines, the system comprising:

a housing;

a circuit board mounted within the housing and forming a structural support element of the system, the circuit board including power supply traces and signal traces connected to the power supply and to the signal lines, respectively;

a first blind mateable connector mounted to the module;

a second blind mateable connector mounted to a chosen position on the circuit board for connection with chosen ones of the power supply and signal traces, the second blind mateable connector configured for mating engagement with the first blind mateable connector;

first and second signal line connectors mounted to the circuit board and to chosen ones of the signal traces, respectively; and

a grounding plate mounted to the circuit board and in electrically conductive contact with the first signal line connector and with the housing so to ground the first signal line connector to the housing, the grounding plate sized to shield the circuit board from EMI generated by the signal lines.

4,967,312

CASE FOR CIRCUIT BOARD WITH LIGHT-RECEIVING ELEMENT

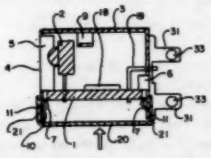
Kaoru Ozawa, and Hiroshi Okawara, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 185,154, Apr. 22, 1988, abandoned. This application Aug. 31, 1989, Ser. No. 401,547

Claims priority, application Japan, Apr. 24, 1987, 62-62920[U]

Int. Cl.[5] H05K 5/00

U.S. Cl. 361—399 **3 Claims**



1. In a circuit board case comprising a horizontal circuit board with electrical and/or electronic circuits attached thereon, a light-receiving element having a light-receiving surface thereon and being disposed on said circuit board, and a housing having walls which define an interior thereof and containing said circuit board and said light-receiving element in said interior, some of said walls defining a bottom opening through which said circuit board and said light-receiving element thereon can be inserted into said interior, the improvement wherein

said light-receiving element is attached to said circuit board, stands thereon and extends perpendicularly so as to be sufficiently separated from electrical and /or electronic circuits on said circuit board,

said light-receiving surface is substantially perpendicular to said circuit board so as to receive light which is incident thereon substantially parallel to said circuit board,

said housing is provided with a window on one of said walls perpendicular to said circuit board, said one of said walls being opposite to said light-receiving surface,

a fall-preventing part, supporting parts and holding parts are formed unistructurally with said housing, protruding inward into said interior, said supporting parts being naturally bent to be elastic so as to be compressed elastically outward as said circuit board is slidingly passed through said opening to a set position, said fall-preventing part and said holding parts being so disposed that, after said circuit board reaches said set position, said holding parts serve to secure said circuit board at said set position and said fall-preventing part serves to prevent said light-receiving element from falling down when an external force is applied thereon through said window,

said supporting and holding parts are separated from each other by the thickness of said circuit board so as to secure said circuit board therebetween at said set position, and

another of said walls has bottom edge portions at said openings rolled such that said circuit board can be passed through said opening easily.

4,967,313

ELECTRONIC CIRCUIT AND METHOD OF PRODUCTION THEREOF

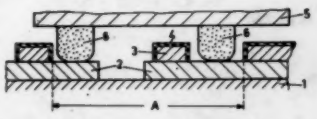
Gianni Berner, Baden, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Filed Jul. 7, 1989, Ser. No. 380,458

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824008

Int. Cl.[5] H05K 7/02

U.S. Cl. 361—400 **8 Claims**



1. An electronic circuit comprising:

a substrate having a top side and an underside and a plurality of conductor tracks applied to the top side;

a semiconductor chip arranged at a distance from the substrate on the top side thereof and electrically connected to the conductor tracks by means of solder connections at given points;

a solder stop layer provided on the conductor tracks between the conductor tracks and the semiconductor chip, said solder stop layer surrounding the solder connections connecting the semiconductor chip to said substrate;

said solder stop layer comprising an oxidizable metal; and

said solder stop layer having an exposed surface covered with an oxide layer.

4,967,314

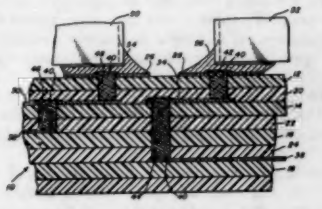
CIRCUIT BOARD CONSTRUCTION

Leo M. Higgins, III, Lakeville, Mass., assignor to Prime Computer Inc., Natick, Mass.

Continuation of Ser. No. 173,999, Mar. 28, 1988, abandoned. This application Nov. 1, 1989, Ser. No. 430,924

Int. Cl.[5] H05K 1/04

U.S. Cl. 361—414 **8 Claims**



1. A printer circuit apparatus comprising a plurality of separate circuit board layers, each board layer comprising a laminate layer having conductive runs thereon and a pre-preg layer, means securing the board layers in a sandwiched array, means defining a continuous interconnecting hole in at least two adjacently disposed circuit board layers between at least two conductive runs on separate circuit board layers, and a curable electrically conductive adhesive disposed within said interconnecting hole providing an electric connection bridge between said at least two conductive runs, the interconnecting

hole as well as the electrical connection bridge passing only between said at least two conductive runs, wherein one of said at least two conductive runs is disposed on one of said two adjacently disposed circuit board layers and the other of said at least two conductive runs is disposed on a third circuit board layer adjacent to the other of said two adjacently disposed circuit board layers, further wherein said third circuit board layer itself defines no hole in alignment with said interconnecting hole, and further including a fourth circuit board layer adjacent to said one circuit board layer itself defining no hole in alignment with said interconnecting hole.

4,967,315

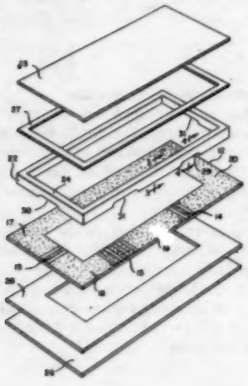
METALLIZED CERAMIC CIRCUIT PACKAGE

Robert L. Schelhorn, Vincentown, N.J., assignor to General Electric Company, Moorestown, N.J.

Filed Jan. 2, 1990, Ser. No. 459,899

Int. Cl.[5] H05K 9/00

U.S. Cl. 361—424 **2 Claims**



1. A shielded RF package, comprising:

a ceramic circuit board substrate including an edge and broad flat upper and lower surfaces for supporting electrical components above said flat upper surface, said substrate including metallization traces on said upper surface for defining interconnections of said components, said traces extending to a region near said edge for defining at least one of an input and an output conductor, said substrate also being metallized on said upper surface around the periphery thereof near said edge, except in an open region adjacent said input and output conductor, to form an upper ground conductor, said substrate also being metallized at least around the periphery of said broad lower surface, near said edge, to define a lower conductor, said substrate also being metallized on said edge, for interconnecting said upper ground conductor and said lower conductor;

a ceramic seal ring defining horizontal upper and lower surfaces and inner and outer vertical surfaces, said seal ring being metallized on said horizontal upper surface and on said outer vertical surface, said seal ring also being metallized on said horizontal lower surface, except in an open region, to form a continuous conductive path between said metallization on said horizontal upper and lower surfaces of said seal ring by way of said metallization on said outer vertical surface, said seal ring being mounted upon said substrate with said unmetallized open regions of said substrate and ring in registry, and with said metallization on said horizontal lower surface of said seal ring in electrical contact with said metallization on said upper surface around said principal portion of said periphery, said seal ring being sealed in place with glass material in said unmetallized regions;

a metallic lid supported by said metallization of said horizontal upper surface of said seal ring and sealed thereto by a first reflowed metal preform; and

a metallic base supporting said ceramic circuit board substrate and sealed to at least said periphery of said metallized portion of said lower surface of said ceramic circuit board substrate by a second metal preform.

4,967,316

ELECTRIC CIRCUIT UNIT

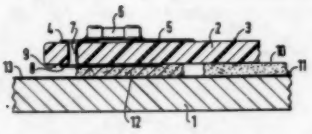
Ulrich Goebel, Reutlingen; Roland Gerstner, Wernau; Walter Roethlingshoefer, Reutlingen; Dietrich Bergfried, Boeblingen, and Michael Krapp, Reutlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,294

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837206

Int. Cl.[5] H05K 9/00

U.S. Cl. 361—424 **6 Claims**



1. An electrical circuit unit having

a grounded portion (1);

a printed circuit board (2) having an upperside (3) and an underside (9), and mounted in said grounded portion;

electrical components (6) mounted on said board (2);

elastic material (10) securing said board underside (9) to the unit;

an electrically conducting layer (8) at least partially covering said board underside (9) and connected to one of said electrical components which forms a capacitor (6);

wherein, in accordance with the invention, an additional elastic material (12) is filled with an electrically conductive metal (13);

said grounded portion (1) and said electrically conductive metal are capacitively coupled together, said elastic material (12) and metal electrically bridging a gap defined between said grounded portion (1) and said conducting layer (8) on said printed circuit board.

4,967,317

EXIT SIGN

George W. Plumly, Granbury, Tex., assignor to Genlyte, Secaucus, N.J.

Filed Jun. 16, 1988, Ser. No. 208,413

Int. Cl.[5] F21V 8/00

U.S. Cl. 362—31 **1 Claim**

1. An illuminated exit sign comprising:

a lamp assembly board having upper and lower surfaces;

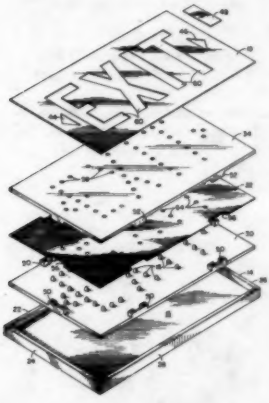
a plurality of elongated incandescent light bulbs mounted on said upper surface of said lamp assembly board and being arranged to form the word "EXIT", each of said bulbs having a filament;

a transparent sheet of plastic having upper and lower surfaces, and having a plurality of holes therein, said holes located so as to receive said plurality of light bulbs when said lower surface of said transparent sheet is placed adjacent to said upper surface of said lamp assembly board, the thickness of said transparent sheet being such that each of said filaments is disposed entirely within said thickness of said transparent sheet between said upper and lower sur-

faces, said transparent sheet further being made of a material with internal reflection properties;

a thin red film interposed between said lamp assembly board and said transparent sheet, said film having a plurality of holes therein corresponding to said holes in said transparent sheet;

an opaque mask layer affixed to said upper surface of said transparent sheet, said mask layer having cutouts demarcating the work "EXIT", said cutouts overlying said light bulbs, the length and width of said lamp assembly board, said transparent sheet, said film, and said mask layer being approximately equal;



wiring means for connecting each of said light bulbs in parallel to an external power source;

bracket means formed integrally on the front and side of said board for securing said board, said red film, and said sheet to one another with tab means integrally formed on the back side of said sheet, fitting into said bracket means;

a frame for housing said board, said light bulbs, said red film, said sheet, said mask layer, and said wiring means;

means for mounting said frame means to a supporting surface; and

battery means for supplying electrical power to said incandescent light bulbs when said external power supply fails.

4,967,318

VEHICLE HEADLIGHT

Alfred Ewert, and Franz Kathmann, both of Lippstadt, Fed. Rep. of Germany, assignors to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 315,762

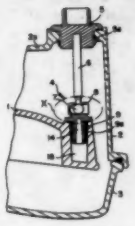
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 8802828; Mar. 3, 1988, 8802829

Int. Cl.[5] B60Q *1/00*

U.S. Cl. 362—61 **21 Claims**

1. In a vehicle headlight for casting a light beam along an optical axis of the type in which a reflector is mounted inside a headlight housing on first and second adjustable pivot-point mechanisms and a third pivot-point mechanism to be selectively rotated about two perpendicular intersecting reflector axes, at least one of the pivot-point mechanisms comprising a spherical head positioned in a receiver that is rigid with the reflector, the spherical head being mounted on the end of the elongated pivot-mechanism pin whose axis is approximately parallel to the optical axis of the headlight, and which extends to an opening in a back wall of the headlight housing, the improvements comprising:

the receiver comprising an elongated shell defining an elongated socket whose axis of elongation is perpendicular to the axis of the pivot mechanism pin, there being an elongated slot in a wall of the shell facing the back wall of the headlight housing through which the pivot-mechanism pin extends, at least one end of the socket being open to allow easy ingress and egress of the spherical head to and



from the socket, the diameter of the socket corresponding to the diameter of the spherical head from said open end to a mounted position of the spherical head, the shell not including an inward rim at at least the open end of the socket.

4,967,319

HEADLIGHT APPARATUS FOR AUTOMOTIVE VEHICLE

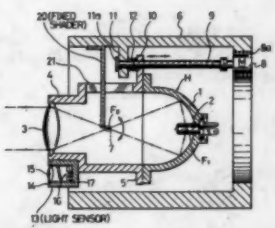
Yasutoshi Seko, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 2, 1989, Ser. No. 346,484

Claims priority, application Japan, May 2, 1988, 63-107612

Int. Cl.[5] B60Q *1/02*

U.S. Cl. 362—61 **8 Claims**



1. A headlight apparatus for an automotive vehicle, comprising:

(a) headlamp means for emitting light in such a way that an optical axis of the light can be adjusted;

(b) first sensor means, attached to said headlamp means, for detecting a presence of a leading vehicle and generating sensor signals corresponding thereto;

(c) adjusting means, associated with said headlamp means, for adjusting the optical axis of said headlamp means;

(d) control means, coupled to said first sensor means and said adjustment means, for actuating said adjusting means in such a way that a position of the axis of said headlamp means can be adjusted to illuminate a predetermined area determined according to a distance to the leading vehicle in response to a signal detected by said first sensor means; and

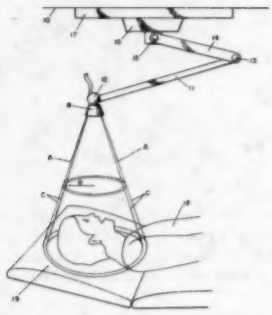
(e) first fixed shading means, fixedly disposed independently from optical axis motion of said headlamp means, for shading part of light emitted by said headlamp means for an opposed vehicle.

4,967,320

DENTAL PROTECTIVE AIR BARRIER LIGHT APPARATUS AND METHOD

Richard C. Paschal, Nashville, Tenn., assignor to Distinctively Different, Inc., Nashville, Tenn.

Filed Apr. 24, 1989, Ser. No. 347,727
Int. Cl.[5] A61C *5/14*
U.S. Cl. 362—96 **3 Claims**



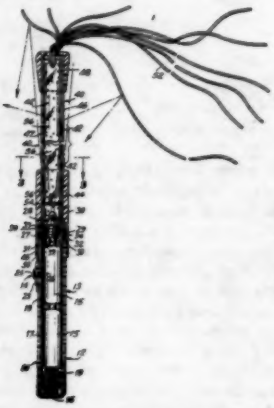
1. A system for providing an air screen barrier to protect a dental team working on a patient positioned in a dental chair, said system comprising:
(a) a source of pressurized air,
(b) a nozzle connected to said pressurized air,
(c) said nozzle including a plurality of air holes whereby the pressurized air is emitted in a continuous air flow pattern,
(d) means for positioning said nozzle in a desired position with respect to the patient's head, whereby said continuous air flow pattern forms a protective air flow envelop about the patient's head.

4,967,321

FLASHLIGHT WAND

Benjamin J. Cimock, Altamonte Springs, Fla., assignor to I & K Trading Company, Vienna, Va.

Filed Nov. 14, 1988, Ser. No. 270,170
Int. Cl.[5] F21L *1/00*
U.S. Cl. 362—101 **7 Claims**



1. An amusement device comprising handle means for receiving a power supply therein, light source means releasably mounted to said handle means for emitting a beam of light, a transparent enclosure means having a first end, said transparent enclosure means extending from said light source means so that light passes through said transparent enclosure means, said transparent enclosure means including a plurality of light reflecting objects distributed in a fixed position randomly along the length thereof, said reflecting objects being injection molded within the surfaces of the walls of said transparent enclosure, said reflecting objects being adapted, in combination with the walls of the transparent enclosure to deflect and refract said omitted light in a plurality of directions, said transparent enclosure containing a plurality of light reflecting objects, said reflecting objects being adapted to be randomly scattered within said transparent enclosure so that emitted light is randomly scattered within said enclosure in a plurality of directions when said amusement device is moved.

4,967,322

REFLECTIVE STICK

Arthur E. DuBois, 20 Myrtle Rd., P.O. Box 707, Dennisport, Mass. 02639

Continuation-in-part of Ser. No. 280,554, Dec. 6, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 390,465
Int. Cl.[5] A45B *3/02*
U.S. Cl. 362—102 **20 Claims**

1. A reflective stick comprising:
a rigid support cylinder having first and second ends, and defining a stick longitudinal axis;
a sheet member having a reflective outer surface, the sheet member being wrapped around and secured to the support cylinder;
spacer means projecting radially from the support cylinder beyond the radial extent of the sheet member outer surface;
a transparent, tubular sheath coaxially surrounding the support cylinder and having first and second ends extending at least the length of the support cylinder, the sheath being maintained in spaced relation from the sheet member by said spacer means;
a generally tubular handle secured in friction-fit, telescopic relation over the first end of the sheath; and
cap means for covering the second end of the sheath.

4,967,323

ADJUSTABLE APPAREL-HELD FLASHLIGHT

Melissa C. Johnson, 758 Main St., Leominster, Mass. 01453, and Robert Howitt, Leominster, Mass., assignors to Melissa C. Johnson, Leominster, Mass.

Filed Nov. 1, 1989, Ser. No. 430,144
Int. Cl.[5] F21L *15/14*
U.S. Cl. 362—103 **14 Claims**

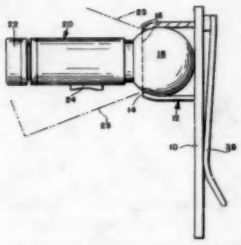
1. An apparel mounted flashlight comprising
a mounting base having a pair of opposite sides,
securement means on one side of the base for temporarily

securing the base to the apparel of the user in any convenient or desired location.

a socket on the other side of the base extending outwardly from the base at a right angle thereto,

a hollow ball mounted in the socket with a friction fit between the ball and socket, the ball and socket being of a material and cooperating size such that the ball may be swiveled in the socket and will remain in the position to which it is swiveled until moved once more in the socket by the direct action of hand manipulation,

a cylindrical casing on the ball, said casing having a hollow interior forming an outward extension of the interior of said hollow ball,



a flashlight lamp bulb, a battery, and a switch therefor mounted in the casing, the battery being located in the casing co-axially with the casing and adjacent to the ball, the lamp bulb being located at the end of the casing opposite the ball,

said casing being angularly adjustable relative to said base by manually swivelling said ball within said socket for up, down and sidewise motions of said casing,

and means within said casing connecting said battery, said lamp and said switch in electrical circuit for energizing said lamp when said switch is closed and for deenergizing said lamp when said switch is opened.

4,967,324

PIVOTABLE LUMINAIRE

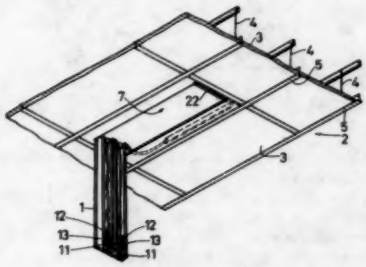
John A. Barclay, Johannesburg, South Africa, assignor to Lascon Lighting Industries (Proprietary) Limited, Johannesburg, South Africa

Filed Jun. 24, 1988, Ser. No. 211,365

Claims priority, application South Africa, Jun. 26, 1987, 87/4620

Int. Cl.[5] F21S *1/02*

U.S. Cl. 362—147 **16 Claims**



1. A luminaire adapted to be mounted to a ceiling comprising carrier means mounted to a ceiling, a reflector unit receivable on the carrier means and being adapted to mechanically and electrically connect to an elongate gas discharge lamp means, the reflector unit being displaceable relative to the carrier means to lower the reflector to a position which will give a worker access to the lamp position when the worker is standing substantially at floor level.

4,967,325

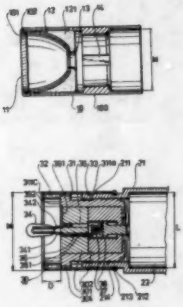
VARIABLE FOCUSING FLASHLIGHT

Shoei-Shuh Shiau, No. 10, Alley 1, Lane 551, Sec. 1, Wan-Shou Rd., Guei-Shan Hsiang, Taoyuan Hsien, Taiwan

Filed Mar. 27, 1990, Ser. No. 500,088

Int. Cl.[5] F21L *7/00*

U.S. Cl. 362—188 **4 Claims**



1. A flashlight, comprising:

a flashlight head assembly having a transparent surface at one end and an engaging opening at an opposite end;

a barrel for receiving a cell means, said barrel being rotatably engaged with said flashlight head assembly at said engaging opening;

a flashlight bulb;

a lamp base having a first portion with said flashlight bulb being fixed on one end of said first portion, said first portion being received by said engaging opening of said flashlight head assembly, and a second portion threadedly engaged with said barrel; and

a key and a keyway assembly, separately disposed between said first portion of said lamp base and said flashlight head assembly, thereby the rotation of said flashlight head assembly will rotate said lamp base relative to said barrel, and said threaded engagement between said second portion of said lamp base and said barrel will allow axial movement of said lamp base relative to said barrel, thus allowing the distance between said flashlight bulb fixed on said lamp base and said transparent surface of said flashlight head assembly to be varied.

4,967,326

MICROCOMPUTER BUILDING BLOCK

Michael D. May, Bristol, United Kingdom, assignor to Inmos Limited, Bristol, England

Continuation of Ser. No. 553,027, Nov. 16, 1983, abandoned. This application Dec. 9, 1986, Ser. No. 938,380

Claims priority, application United Kingdom, Nov. 26, 1982, 8233733

Int. Cl.[5] G06F *15/16*

U.S. Cl. 364—220 **22 Claims**

1. A method for communicating data between processes in an array of computers, each computer comprising a single integrated circuit chip having an on-chip processor, an on-chip multiple bit addressable memory, and a plurality of on-chip communication links, the computers in said array being coupled by a plurality of connecting means, said connecting means providing non-shared connections between a pair of communi-

cation links on different ones of said array of computers, which method comprises the steps of:

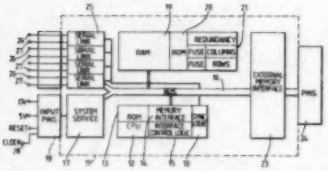
providing on each chip a respective program store holding a respective program for a respective process to be executed by that chip, each program having an instruction sequence including at least one communication instruction in a communication stage and decoding on-chip each instruction for the corresponding process,

executing on one or more of said chips said processes without using a central control for decoding instructions,

storing status indicators in respective devices associated with said links to indicate the status of data communication through said links,

transmitting data without a destination address through said connecting means between an outputting process on one computer executing a process having an output communication stage and an inputting process on another computer executing a program having an input communication stage,

said transmitting step including synchronizing said data transmitting so that each of said outputting and inputting



processes may proceed beyond said communication stage of its respective program only when both of said outputting and inputting processes have reached said communication stages,

said synchronizing step including interrupting execution of whichever one of said outputting and inputting processes attempts to communicate with another of said processes before said another process has reached said communication stage, storing in a storage element a status indicator indicating that the process has been interrupted, and recommencing execution of that interrupted process after the other process reaches said communication stage,

said transmitting step including selectively addressing one of said plurality of links on said one of the computers to effect a data transmission by said selective addressing, said transmitting step including determining the destination of a message by selectively addressing a selected link on said one of the computers, directly connecting said link by a non-shared wire connection to another link on a different chip and transmitting serially a message without a destination address through said link and wire connection.

4,967,327

POTRACK LIGHT FIXTURE

Helda L. Thurlow, 10814 Riverview, Houston, Tex. 77043

Filed Jan. 16, 1990, Ser. No. 466,064

Int. Cl.[5] F21V *21/00*

U.S. Cl. 362—249 **2 Claims**

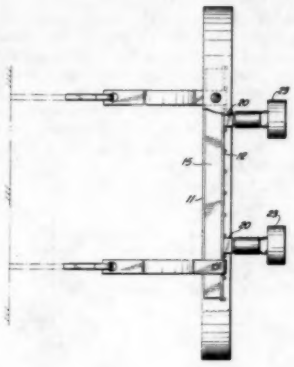
1. A fixture comprising:

(a) an elongated, suspendable structure having a racetrack shape for holding kitchen utensils above a work surface, the structure comprising a regular grid;

(b) a light track having a roughly C-shaped cross section resting on the grid and positioned along the major axis of the suspendable structure with the open portion of the track facing downwardly;

(c) the grid elements being arranged symmetrically within the structure such that the major axis of the structure lies along the midpoint of a series of grid openings;

(d) a plurality of light cans, each can comprising a light end and an attachment end, the attachment end being adapted to mate with the track, after insertion of its free end into the track, by a 90 degree rotation thereof;



(e) each grid opening being sufficiently large to permit insertion of the attachment end of a light can upwardly through the grid openings into the downward-facing open portion of the light track.

4,967,328

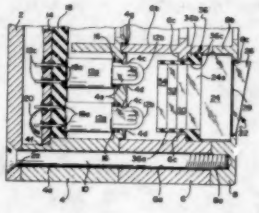
OMNIDIRECTIONAL SHOCK ABSORBING LAMP MOUNTING SYSTEM FOR ILLUMINATED APPARATUS

Vanacan Tatavoosian, Mission Viejo, Calif., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 22, 1990, Ser. No. 497,454

Int. Cl.[5] F21V *21/00*

U.S. Cl. 362—267 **14 Claims**



1. An omnidirectional shock absorbing lamp mounting system comprising:

a lamp comprising a tubular glass envelope extending from one end of an enlarged body portion;

a first resilient member annularly disposed around said tubular envelope against said one end of said body;

a second resilient member disposed against a second end of said body portion opposite said one end; and

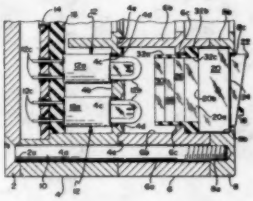
housing means constraining said resilient members partly compressed against said ends of said lamp body portion, resiliently supporting said lamp between said resilient members.

4,967,329

LENS MOUNTING AND SEAL FOR ILLUMINATED APPARATUS

Vanacan Tatavoosian, Mission Viejo, and George E. Schaeffer, El Toro, both of Calif., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 22, 1990, Ser. No. 497,372
Int. Cl.[5] F21V *29/00*
U.S. Cl. 362—267 23 Claims



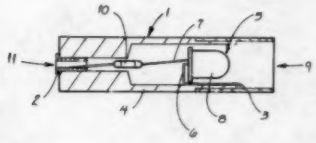
1. Illuminated apparatus comprising:
a housing having a front opening;
a light source within said housing;
a lens mounted in said front opening;
filter means disposed between said lens and said light source within said housing, said filter means passing only predetermined wavelengths from said light source to said lens;
sealing means comprising an opaque elastomer disposed around a peripheral edge of said filter means in intimate contact therewith, said elastomer having an outwardly extending peripheral flange; and
means compressing said flange against said housing along an entire interior periphery thereof preventing light passage between said sealing means and said housing.

4,967,330

LED LAMP WITH OPEN ENCASEMENT

Howard F. Bell, P.O. Box 1727, Lake Panasoffkee, Fla. 33538, and Michael C. Lane, 337 E. Halifax, Mesa, Ariz. 85201

Filed Mar. 16, 1990, Ser. No. 494,686
Int. Cl.[5] F21V *3/00*
U.S. Cl. 362—311 20 Claims



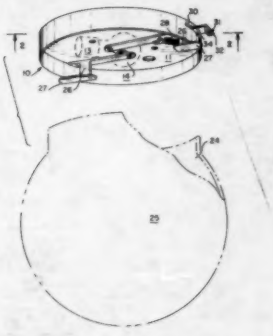
1. An LED Lamp with Open Encasement, comprising:
(a) A generally hollow cylindrical encasement including at least one opening therein allowing gases and fluids exterior to . said encasement to circulate within the interior thereof, means forming an electrically conducting co 'act on and outer surface of said cylindrical encasem an electrically conducting contact at a base or end o said cylindrical encasement, means for transmitting light through the end of said cylindrical encasement opposite the aforesaid electrically conducting base contact, and an insulative portion formed from nonconducting materials separating said contacts;
(b) At least one light emitting diode disposed within the interior of said generally hollow cylindrical encasement, having its light producing portion directed away from said base contact and parallel to the axis of said encasement, its positive lead connected to the aforesaid electrically conducting base contact and its negative lead connected to the aforesaid electrically conducting surface contact.

4,967,331

HOLDER FOR GLASS ELECTRIC LAMP DOME

Hector Rubin, Ave. Nazca 2799/2005, 1417 Capital Federal, Argentina

Filed Jan. 22, 1990, Ser. No. 468,044
Int. Cl.[5] F21V *17/06*
U.S. Cl. 362—433 4 Claims



1. A holder for detachably mounting a glass electric dome of the type having an inwardly directed rim portion around an opening thereof comprising:
a. a base plate including a downwardly extending peripheral flange having a slotted opening therein;
b. a lever arm pivotally mounted on said base plate;
c. two dome holding arms attached to opposite ends of said lever arm and movable radially inwardly and outwardly from a dome locking position to a dome releasing position when said pivot arm is rotated, one of said dome holding arms having an integral extension thereof, said integral extension having a finger engageable terminus at the end opposite the end attached to said pivot arm for moving said arm to pivot said lever arm, said finger engageable terminus extending through said openings; and
d. spring biasing means connecting said base plate and said lever arm to continuously urge said lever to a position where said dome holding arms are moved radially outwardly in dome locking position, said integral extension of said dome holding arm having a notch therein sized to engage said downwardly extending peripheral flange at said slot to provide a lock means to hold said lever arm in a position where said dome holding arms are retracted from said dome holding position.

4,967,332

HVIC PRIMARY SIDE POWER SUPPLY CONTROLLER INCLUDING FULL-BRIDGE/HALF-BRIDGE DRIVER

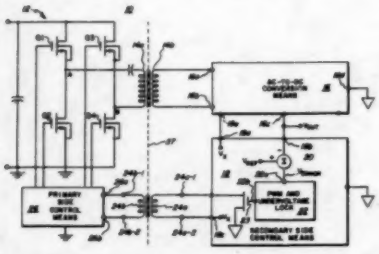
Glenn S. Claydon, Troy, and William J. Laughton, Syracuse, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 26, 1990, Ser. No. 484,945
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—17 11 Claims

1. A power supply, having a primary side and a secondary side, for converting a first DC potential to a second DC potential of predetermined amplitude, comprising:
primary side conductor means for receiving said first DC potential with respect to a primary side common potential;
chopping means coupled to said primary side conductor

means for converting said first DC potential to a chopped signal with a periodically varying amplitude, said chopping means comprising first and second switching devices connected in series in a first half-bridge and further comprising third and fourth switching devices connected in series in a second half-bridge, said first and second half-bridges being connected in parallel so as to form a full-bridge, each of said switching devices having a separate respective device drive means coupled thereto for normally driving said chopping means as a full-bridge power converter;

a potential transformer having a primary winding for receiving said chopped signal with respect to said primary side common potential, and a secondary winding for providing a secondary signal with respect to a secondary side common potential which is isolated from said primary side common potential;



AC-to-DC converter means for converting said secondary signal to at least said second DC potential;

secondary side control means for providing a digital data signal indicative of magnitude and polarity of the error of the actual amplitude of said second DC potential with respect to said predetermined amplitude;

isolation coupling means for transforming said digital data signal from said secondary side to said primary side while maintaining isolation thereof; and

primary side control means responsive to said digital data signal for controlling said chopping means so as to reduce said error, said primary side control means being adapted to selectively operate said chopping means in a PWM mode, a resonant mode, and a phase-shift mode, said primary side control means further comprising drive coupling means for selectively controlling said device drive means to operate said chopping means as a half-bridge power converter.

4,967,333

STABILIZED POWER SUPPLY WITH REDUCED RIPPLE FACTOR

Bernard Callier, and Jean-Pierre Maynard, both of Voisins le Bretonneux, France, assignors to General Electric CGR S.A., Issy les Moulineaux, France

Filed Jun. 13, 1989, Ser. No. 365,366

Claims priority, application France, Jun. 17, 1988, 88 08112

Int. Cl.[5] H02M *3/335, 5/458*

U.S. Cl. 363—17 **5 Claims**

1. A stabilized power supply with a reduced ripple factor, especially for X-ray tubes, comprising:

a first rectifier which can be connected to an electrical mains supply,

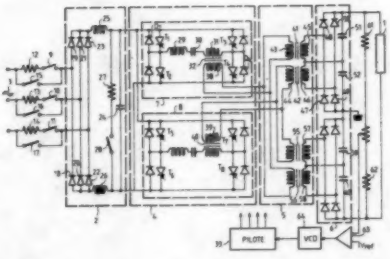
a converter circuit to convert a dc signal delivered by the first rectifier into an ac signal,

said converter circuit comprising n dc/ac converter units, working at one and the same frequency and triggered with respect to each other substantially with a phase shift of $2\pi/n$,

a circuit to raise the voltage of the ac signals produced by the dc/ac converter circuit,

and a second circuit to rectify the ac signals whose voltages are thus raised,

wherein the voltage raising circuit comprises 2n transformers being divided into a first and a second group of, each, n transformers, the primary winding of each transformer



of the first group being connected in parallel with the primary winding of a corresponding transformer of the second group to the output of a dc/ac converter unit, the secondary windings of all the transformers of each group are series connected to the input of one of two second rectifiers, and wherein the two second rectifiers are series connected with each other.

4,967,334

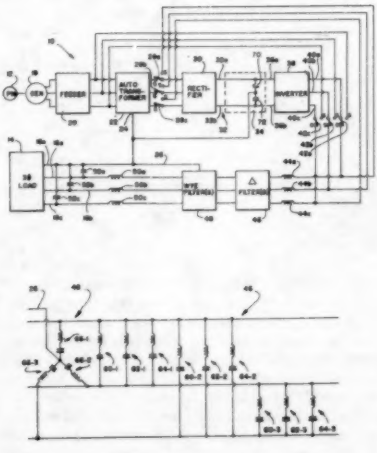
INVERTER INPUT/OUTPUT FILTER SYSTEM

Alexander Cook; John Dhyanchand, both of Rockford, Ill.; Rasappa Palaniappan, Michigan City, Ind., and Dwight Schmitt, Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Sep. 12, 1989, Ser. No. 406,263

Int. Cl.[5] H02M *1/12, 1/14, 5/42*

U.S. Cl. 363—34 **6 Claims**



1. A filter system for a three-phase, four-wire AC power system having an AC source which develops polyphase AC input power, means coupled to the AC source for developing a neutral on a neutral line from the AC input power, a rectifier

for rectifying the AC input power to produce DC power having a ripple component and an inverter having first and second inputs coupled to the rectifier for producing three-phase inverter AC power on three phase lines, comprising:

a first filter comprising three impedances each connected between two phase lines such that the first filter is connected in a delta configuration, the three impedances attenuating a first component in the inverter AC power at a first selected frequency wherein the line-to-line phase displacement of the first component is within one of first and second ranges wherein the first range is between 90° and 150° and the second range is between 210° and 270°;

a second filter comprising three impedances each connected between a phase line and the neutral line such taht the second filter is connected in a wye configuration, the three impedances attenuating a second component in the inverter AC power at a second selected frequency wherein the line-to-line phase displacement of the second component is outside the first and second ranges; and

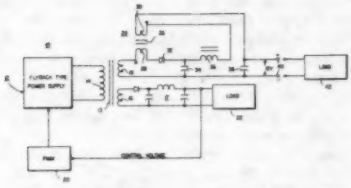
a DC filter coupled between the rectifier and the inverter wherein the DC filter includes first and second series-connected capacitors coupled across the first and second inputs of the inverter and wherein a junction between the capacitors is coupled to the neutral line.

4,967,335

SATURABLE TRANSFORMER REGULATOR FOR FLYBACK POWER SUPPLY

John G. Konopka, Barrington, Ill., assignor to Zenith Electronics Corp., Glenview, Ill.

Filed Sep. 21, 1989, Ser. No. 410,768
Int. Cl.[5] H02P *13/00*; H02M *3/335*
U.S. Cl. 363—82 **6 Claims**



1. In combination with a power transformer having a secondary winding;

an output filter capacitor;

rectifier means coupled between said secondary winding and said output filter capacitor developing a peak output voltage across said output filter capacitor that rises to undesirable levels under no load conditions; and

saturable transformer means connected between said secondary winding and said rectifier means for automatically compensating for said rise in peak voltage under no load conditions and for imposing minimal voltage drop across said saturable transformer means under full load conditions.

4,967,336

HIGH VOLTAGE BRIDGE INTERFACE

Robert B. Davies; Warren J. Schultz, both of Tempe, and James J. Stipanuk, Chandler, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

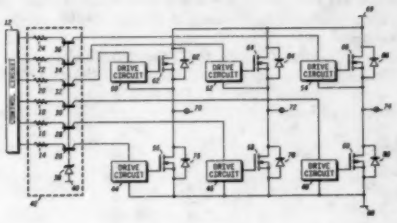
Filed Feb. 26, 1990, Ser. No. 484,946
Int. Cl.[5] H02M *7/5387*
U.S. Cl. 363—132 **15 Claims**

1. A method of partitioning a motor control circuit, comprising the steps of:

developing a plurality of control signals having a predetermined phase relationship therebetween;

supplying output current through a plurality of power transistors coupled between high voltage power supply conductors in response to a plurality of output signals wherein the output current is sourced and sunk through the output of the motor control circuit; and

enabling a plurality of transistors each having a base, an emitter and a collector, said bases being coupled together



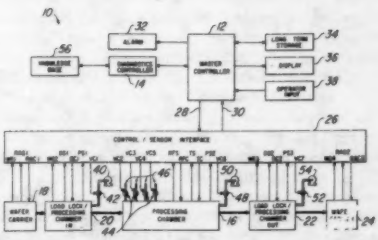
to a source of operating potential, said emitters being coupled for receiving ones of said plurality of control signals, said collectors being coupled for supplying respective ones of said plurality of output signals in response to said plurality of control signals while maintaining unilateral isolation for said plurality of control signals from said high voltage power supply conductors.

4,967,337

AUTOMATED DIAGNOSTIC SYSTEM

Roe E. English, Euless; Michael A. Kilgore, McKinney, and Jerry A. Crone, Kaufman, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 11, 1988, Ser. No. 256,020
Int. Cl.[5] G06F *11/30, 15/46*
U.S. Cl. 364—184 **10 Claims**



1. An automated diagnostic system, comprising:

a machine for performing process steps on a workpiece, wherein a plurality of process variables assume different states;

an interface coupled to said machine for sensing the state of said plurality of process variables, and for controlling said plurality of process variables;

a master controller coupled to said interface for setting values for the plurality of process variables to be controlled, and for reading the state of the plurality of process variables to be sensed, wherein said master controller generates an error signal and suspends operation of said machine when a sensed process variable moves out of a preselected range; and

a diagnostics controller coupled to said master controller for, when operation of said machine has been suspended by said master controller, sensing the state of process variables to be sensed, for querying an operator regarding other states of said machine, and for applying the sensed

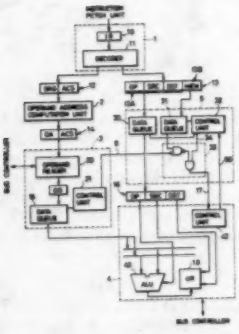
states and results of operator inquiries to an expert system having a set of rules and a set of facts capable of identifying possible causes for the error signal, to determine the cause of the error.

4,967,338

LOOSELY COUPLED PIPELINE PROCESSOR

Tokuzo Kiyohara, Osaka, and Masashi Deguchi, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 28, 1987, Ser. No. 137,923
Claims priority, application Japan, Dec. 29, 1986, 61-311023
Int. Cl.[5] G06F *9/38*
U.S. Cl. 364—200 **24 Claims**



1. A central processing unit comprising:

(a)an instruction decoder for decoding an instruction and, in response, generating first, second and third control signals representing respective first, second and third control information, said first control information including information for operand address computation and memory access, said second information including (a) information designating a category of operation and (b) operands designating sources and destinations of information, said third control information including information designation if an operand stored in memory is required:

(b) an operand address computation unit for computing an operand address in in response to said first control information received from said instruction decoder and supplying an operand address signal in response;

(c) an operand pre-fetch unit for fetching and queuing a memory operand in response to said operand address signal, and for outputting (a) said memory operand and (b) a first signal indicating that said memory operand has been queued in said operand pre-fetch unit;

(d) a control information buffer receiving said first, second and third control signals from said instruction decoder, said control information buffer queuing and outputting said second control information, and for outputting a second signal indicating that said second control information is valid in response to receiving said first signal and said third control information indicating that an operand is required from memory; and

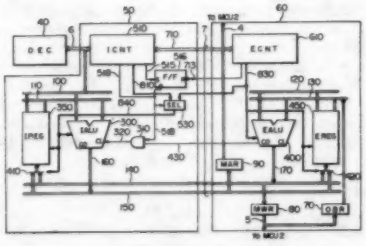
(e) an execution unit receiving said second signal from said control information buffer and, in response thereto, outputting a third signal representing that said arithmetic unit requires said second control information queued in said control information buffer wherein said control information buffer outputs the second control information signal to said execution unit in response to the third signal, and said execution unit receives the memory operand signal and the second control information signal and, in response thereto, executes an operation.

4,967,339

OPERATION CONTROL APPARATUS FOR A PROCESSOR HAVING A PLURALITY OF ARITHMETIC DEVICES

Hiroaki Fukumaru; Soichi Takaya; Takayuki Morioka, all of Hitachi; Tadaaki Bandoh, Ibaraki; Shinichiro Yamaguchi, Hitachi, and Kenji Hirose, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering, Ltd., Hitachi, both of, Japan

Filed Apr. 8, 1988, Ser. No. 179,554
Claims priority, application Japan, Apr. 10, 1987, 62-86897
Int. Cl.[5] G06F *9/38, 9/30, 12/00, 7/00*
U.S. Cl. 364—200 **4 Claims**



1. An operation control apparatus for a processor including an address calculation unit having an arithmetic device for calculating an effective address of an operand and an instruction execution unit having another arithmetic device for executing an instruction in a pipeline processing, said instruction execution unit performing execution of an instruction based on an effective address delivered from said address calculation unit, and said address calculation unit calculates, after delivery of said effective address to said instruction execution unit, an effective address of an operand of an instruction to be executed next, said apparatus comprising:

means for judging if the arithmetic device in said instruction execution unit must operate on data having a data length exceeding a predetermined bit width; and

an expanded bit width arithmetic logic unit constituted by said arithmetic devices in such a way that when said judging means makes a judgement that the data length exceeds a predetermined bit width, the arithmetic device in said address calculation unit is used as an expanded arithmetic portion for the arithmetic device in said instruction execution unit.

4,967,340

ADAPTIVE PROCESSING SYSTEM HAVING AN ARRAY OF INDIVIDUALLY CONFIGURABLE PROCESSING COMPONENTS

Robert L. Dawes, Allen, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Continuation of Ser. No. 743,920, Jun. 12, 1985, abandoned.
This application Nov. 18, 1988, Ser. No. 273,155
Int. Cl.[5] G06F *15/16*
U.S. Cl. 364—200 **33 Claims**

1. A random access processor for real-time signal processing of an input signal, comprising an array having at least first and second contiguous processing elements, each of said processing elements including:

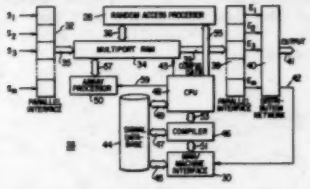
first, second and third programmable switches, said first programmable switch of said second processing element slaved to said third programmable switch of said first processing element,

a multiplier having a first input connected to an output of said first programmable switch, a second input and an output;

a latch having an input connected to an output of said second

programmable switch and an output connected to said second input of said multiplier;

an adder having a first input connected to said output of said multiplier, a second input connected to an output of said second programmable switch, and an output connected to an input of said third programmable switch; and



a programmable delay element having an input connected to an output of said first programmable switch, a control terminal for receiving data for setting an amount of delay provided by said programmable delay element, and an output.

4,967,341

METHOD AND APPARATUS FOR PROCESSING DATA BASE

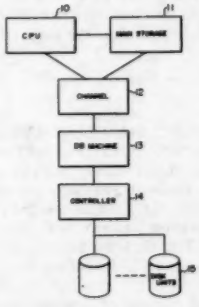
Akira Yamamoto; Tadashi Ohsone, both of Yokohama; Masashi Tsuchida, Tokyo; Hiroyuki Kitajima, Yokohama; Kazuhiro Satoh, Ebina; Yoshiaki Yamashita; Nobuhiro Taniguchi, both of Hadano; Kazuhiko Ohmachi, Kawasaki, and Shinichi Fukushima, Kamakura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 13,440, Feb. 11, 1987, abandoned. This application Oct. 6, 1989, Ser. No. 418,343

Claims priority, application Japan, Feb. 14, 1986, 61-28807; Mar. 12, 1986, 61-52438

Int. Cl.[5] G06F *15/20, 15/40*

U.S. Cl. 364—200 **15 Claims**



1. A method for processing a data base in an information processing system having a memory unit for storing tables each having columns and rows of data and at least one data base processing unit, comprising the steps of:

transferring a table from said data base to said memory unit and storing contents of columns of said table specified in an operation to be performed by said information processing system into an internal memory in said data base processing unit;

reading another table to be joined with said table from said data base; and

storing contents of columns of said another table to be joined with said table into said internal memory in said data base processing unit in synchronism with said reading step.

4,967,342

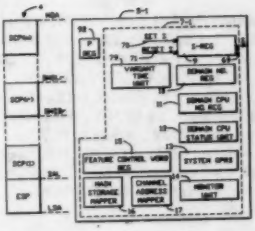
DATA PROCESSING SYSTEM HAVING PLURALITY OF PROCESSORS AND CHANNELS CONTROLLED BY PLURALITY OF SYSTEM CONTROL PROGRAMS THROUGH INTERRUPT ROUTING

Robert S. Lent, 450 Stratford Park Ct., San Jose, Calif. 95136; Arthur C. Willis, 267 Casitas Blvd., Los Gatos, Calif. 95030, and Robert W. Doran, 52 Marine Parade, Herne Bay, Auckland, New Zealand

Division of Ser. No. 930,965, Nov. 12, 1986, which is a continuation of Ser. No. 500,379, Jun. 2, 1983, abandoned. This application Feb. 17, 1989, Ser. No. 312,732

Int. Cl.[5] G06F *9/22, 9/44, 9/46, 13/32*

U.S. Cl. 364—200 **18 Claims**



1. A data processing system responsive to an instruction stream, comprising:

a central processing unit generating requests for channel operations under control of a dynamically selected one of a plurality of system control programs, each for coordinating operation of the data processing system;

a main storage unit connected to the central processing unit, storing the plurality of system control programs;

a plurality of channels, connected to the central processing unit, for performing channel operations requested by the central processing unit and generating requests for interrupts;

a logical processor including means, in communication with the central processing unit and the main storage unit, for dynamically selecting a current system control program from the plurality of system control programs to control the central processing unit, and means for storing an identifier of the dynamically selected current system control program; and

interrupt routing means, in communication with the central processing unit, the logical processor and the plurality of channels, for routing requests for interrupts supplied by the channels to the central processing unit, including

a plurality of logical channel means, in communication with corresponding ones of the plurality of channels and responsive to a request for channel operation from the central processing unit supplied to the corresponding channel, for reading and storing a request identifies indicative the dynamically selected current system control program controlling the central processing unit when the request is made; and

control means, responsive to a request for an interrupt by a channel and connected to the logical processor means and the plurality of logical channel means, for comparing the identifier of the dynamically selected current system control program stored in the logical processor with the request identifier stored in the logical channel means to generate a comparison and controlling the interrupt routing means in response to the comparison; and

means, in communication with the logical processor and responsive to the control means, for signalling the logical processor to dynamically select a system control program, other than the dynamically selected current system con-

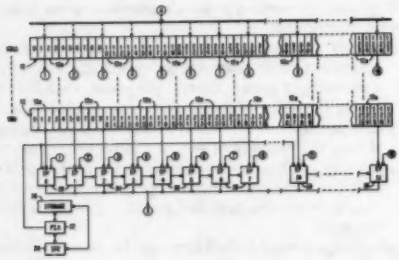
trol program, if a match is not indicated by the comparison.

4,967,343

PIPELINED PARALLEL VECTOR PROCESSOR INCLUDING PARALLEL CONFIGURED ELEMENT PROCESSORS FOR PROCESSING VECTOR ELEMENTS IN PARALLEL FASHION

Chuck H. Ngai; Edward R. Wassel, both of Endwell, and Gerald J. Watkins, Endicott, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation-in-part of Ser. No. 495,563, May 18, 1983, Pat. No. 4,630,192. This application Sep. 9, 1983, Ser. No. 530,842
Int. Cl.[5] G06F *15/16*
U.S. Cl. 364—200 8 Claims



1. A vector processor, comprising:

a plurality of vector registering means, each of said vector register means storing a vector, said vector including a plurality of elements, each of said vector register means including a plurality of smaller registers, each of said smaller registers storing one or more elements of said vector, the number of said one or more elements in said smaller registers being less than the number of said plurality of elements; and

a plurality of element processor means connected, respectively, to said plurality of smaller registers of said plurality of vector register means,

said one or more elements of each smaller register comprising a plurality of individual elements sequentially labelled from a first element to a last element,

said plurality of element processor means retrieving, in parallel, corresponding ones of said plurality of individual elements from each of said smaller registers of a one said vector register means and from each of said smaller registers of another said vector register means,

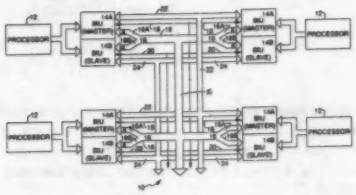
said plurality of element processor means performing a processing operation on the corresponding ones of said plurality of individual elements retrieved, in parallel, from each of said smaller registers of said one of said vector register means and said another of said vector register means thereby producing a set of results, said set of results being stored in one of said plurality of vector register means.

4,967,344

INTERCONNECTION NETWORK FOR MULTIPLE PROCESSORS

Daniel C. Scavezze, Chelmsford, Mass.; Miriam E. Leeser, Ithaca, N.Y.; Gerald A. Kammerer, Wrentham, and William R. Prescott, Plainville, both of Mass., assignors to Codex Corporation, Mansfield, Mass.

Continuation-in-part of Ser. No. 716,348, Mar. 26, 1985, abandoned. This application Mar. 1, 1988, Ser. No. 162,820
Int. Cl.[5] G06F *11/20, 13/36*
U.S. Cl. 364—200 24 Claims



1. Network apparatus for connecting a plurality of processors, said apparatus comprising

a first parallel data bus connected to each processor for transmitting data between said processors,

a second parallel data bus connected to each processor for transmitting data between said processors,

means for transmitting data such that a portion of the transmitting data is transmitted on the first parallel data bus and the remaining portion is transmitted on the second parallel data bus simultaneously across both said buses during normal operation,

means at each processor for detecting the presence of a failure in either bus and for establishing which bus contains the failure,

means at each processor for shifting data transmission exclusively to said first data bus if said second data bus has failed and to said second data bus if said first data bus has failed, said data transmission thereafter being carried out at a lower data rate than the data rate during normal operation.

4,967,345

METHOD OF SELECTING LEAST WEIGHT ROUTES IN A COMMUNICATIONS NETWORK

Kathryn E. Clarke, Little Silver, N.J.; John E. Drake, Jr., Pittsboro, N.C.; Diane P. Pozefsky, and William E. Siddall, both of Chapel Hill, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 23, 1988, Ser. No. 210,471
Int. Cl.[5] H04Q *11/00*
U.S. Cl. 364—200 5 Claims

1. An improved method of selecting least weight routes through a communications network including network nodes interconnected by transmission groups, said nodes and transmission groups having associated weights, said method comprising the steps of:

(a) adding a selected root node to a tree;

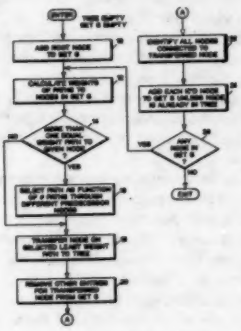
(b) establishing a set comprising all network nodes connected to any node in the tree other than a network node already in the tree;

(c) calculating the weights of paths from the root node to each node in the set;

(d) selecting a path having the least weight or, if multiple paths to a given node have equal least weights, quasi-randomly selecting one of those multiple paths;

(e) transferring to the tree the node in the selected least weight path;

(f) removing any other entries for the transferred node from the set;



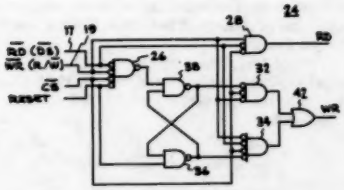
(g) repeating steps b through f until all nodes in the network have been transferred to the tree.

4,967,346

UNIVERSAL MICROPROCESSOR INTERFACE CIRCUIT

Philip Freidin, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 14, 1988, Ser. No. 167,598
Int. Cl.[5] G06F *3/00*
U.S. Cl. 364—200 **10 Claims**



1. An apparatus for alternatively connecting to at least one first type of microprocessor that generates first and second timing signals of a first type or to at least one second type of microprocessor that generates first and second timing signals of a second type and for producing WRITE data signals and READ data signals in response to either the first type or the second type first and second timing signals, whereing the first and second timing signals of the first type determine whether a read operation or a write operation is to occur for the at least one first type fo microprocessor and the first and second timing signals of the second type determine whether a read operation of a write operation is to occur for the at least one second microprocessor, the apparatus comprising:

first means, responsive to the first and second timing signals of the first type, for producing the WRITE data signals and the READ data signals;

second means, responsive to the first and second timing signals of the second type, for producing the write data signals and the READ data signals;

indicating means, responsive to the first and the second timing signals of the first type or to the first and the second timing signals of the second type, for indicating whether the first and second timing signals are of the first type or of the second type; and

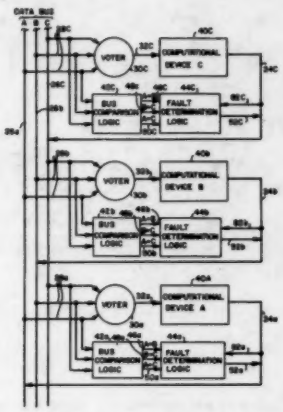
activating means, responsive to said indicating means, for activating either said first means or said second means.

4,967,347

MULTIPLE-REDUNDANT FAULT DETECTION SYSTEM AND RELATED METHOD FOR ITS USE

Steven E. Smith, Manhattan Beach, and Kenneth J. Murphy, Canoga Park, both of Calif., assignors to BH-F (Triplex) Inc., Torrance, Calif.

Filed Apr. 3, 1986, Ser. No. 847,956
Int. Cl.[5] G06F *1/00, 11/16, 7/02, 7/20, 15/16;* H01R *13/64*
U.S. Cl. 364—200 **20 Claims**



1. A multiple-redundant computer system, comprising:

a plurality of synchronized computational devices, each of which has a processor and a memory, and a data path between its processor and its memory;

an equal plurality of data buses associated one with each of the computational devices;

means in each computational device for intercepting data on the data path between the memory and its associated processor, and transmitting the intercepted data to the data bus associated with the computational device;

an equal plurality of voter circuits associated one with each of the computational devices and each connected to receive inputs from all of the plurality of data buses and to supply a single voted output to its associated computational device;

an equal plurality of fault determination logic circuits associated one with each of the computational devices, and each connected to receive inputs from all of the plurality of data buses and to each generate a fault status word indicative of any fault conditions in the system; and

means associated with each computational device, for periodically reading the fault status word from the fault determination logic onto the associated data bus and through the associated voter circuit to the associated computational device, wherein each of the computational devices is periodically supplied with a voted fault status word indicative of any fault conditions in the system as determined by a majority of the fault determination logic circuits.

4,967,348

DATA NAME STANDARDIZING SYSTEM

Ichiro Naito; Takahiko Kobayashi, both of Tokyo, and Hiroyuki Maezawa, Tama, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering, both of Tokyo, Japan

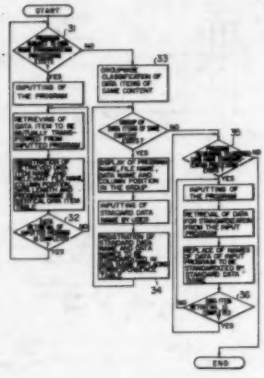
Filed Nov. 15, 1988, Ser. No. 271,728
Claims priority, application Japan, Nov. 20, 1987, 62-292177
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—200 **12 Claims**

1. A system for standardizing names of data used by a pro-

gram running on information processing equipment by analyzing contents of said program, the system comprising:

(a) decision means for comparing contents of data items in a plurality of data files referenced by said program to thereby determine identity of said data items;

(b) determination means responsive to an output of said decision means for determining one standardized name for the data items having identity of the contents;



(c) retrieving means, operatively associated with said decision means, for finding a division of said program which refers to the data items having identity; and

(d) replacing means, operatively associated with said retrieving means, for replacing the names of the data items having identity found by said decision means with a standardized data name for said program.

4,967,349

DIGITAL SIGNAL PROCESSOR SUITABLE FOR EXTACTING MINIMUM AND MAXIMUM VALUES AT HIGH SPEED

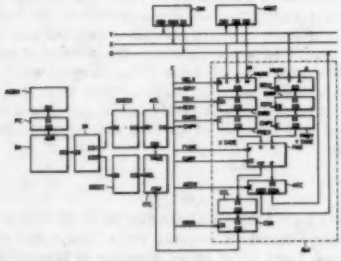
Kazuyuki Kodama, Nishitama; Hirotada Ueda, Kokubunji; Kenji Keneko, Sagamihara; Yoshimune Hagiwara, Hachioji, and Hitoshi Matsushima, Tachikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 5, 1988, Ser. No. 140,792

Claims priority, application Japan, Jan. 16, 1987, 62-7504

Int. Cl.[5] **G06F** *9/22*

U.S. Cl. 364—200 **14 Claims**



1. A digital signal processor for extracting a maximum value or a minimum value from a plurality of data items, comprising:

a data memory for storing a plurality of data from which a maximum value or a minimum value is extracted;

an arithmetic logic unit for extracting a predetermined arithmetic and logical operation, said arithmetic logic unit including an accumulator for storing an operation result and a condition code register for storing a status of a numerical value after the operation;

an instruction memory for storing micro-instructions, said data memory and said arithmetic logic unit being controlled by the micro-instructions;

detection means for detecting a value of a condition code from said condition code register designated by a decoded value of predetermined bits of an operand of the micro-instructions; and

control means for generating a control signal for said arithmetic logic unit by executing a logical operation between an output of said detection means and a decoded value of an operation code of the micro-instructions, whereby said control means changes an operation mode of said arithmetic logic unit to a load accumulator mode or a no-operation mode in accordance with the designated value of the condition code when the decoded value of the operation code of the micro-instructions indicates a load accumulator comparison.

4,967,350

PIPELINED VECTOR PROCESSOR FOR EXECUTING RECURSIVE INSTRUCTIONS

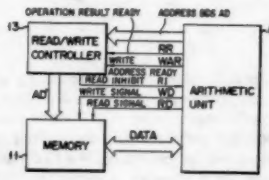
Akira Maeda; Masahiko Yoshimura, both of Yokohama, and Satoru Hashimoto, Kamakura, all of Japan, assignors to Director General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Mar. 30, 1988, Ser. No. 175,292

Claims priority, application Japan, Sep. 3, 1987, 62-219152

Int. Cl.[3] **G06F** *9/38, 15/347*

U.S. Cl. 364—200 **8 Claims**



1. A vector computer comprising: memory means for storing vector data, each vector data comprising vector components;

a pipelined arithmetic unit for reading out, in a plurality of stages, the vector components from said memory means by using a read address, performing vector operating on the vector components read from said memory means, each vector component being vector-operated at each stage of said of the pipelined arithmetic unit, and storing operation results of respective stages in said memory means by using write addresses; and

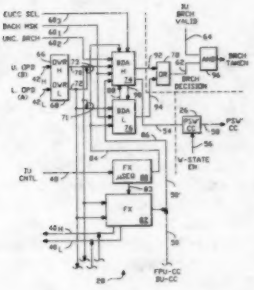
read control means for storing the write addresses from said pipelined arithmetic unit used for writing the operation results of the respective stages, comparing the read address from said pipelined arithmetic unit with the write addresses stored, and inhibiting a read out operation of the pipelined arithmetic unit when it is detected that the read address coincides with at least one of the write addresses stored.

4,967,351

CENTRAL PROCESSOR ARCHITECTURE IMPLEMENTING DETERMINISTIC EARLY CONDITION CODE ANALYSIS USING DIGIT BASED, SUBTERM COMPUTATION AND SELECTIVE SUBTERM COMBINATION

Allan J. Zmyslowski, and Pat Y. Hom, both of Sunnyvale, Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Oct. 17, 1986, Ser. No. 920,515
Int. Cl.[5] G06F 9/28, 7/02
U.S. Cl. 364—200 5 Claims



1. Apparatus for executing processor instructions including a condition code setting instruction and a conditional instruction, the condition code setting instruction having associated data operands, each data operand including a plurality of data bits, said apparatus comprising:

(a) means for the pipelined execution of processor instructions through a plurality of pipeline cycles including an instruction decode cycle and an instruction execution cycle, said pipelined execution means including means for decoding processor instruction to provide an identification control signal in response to the decode identification of a condition code setting instruction and a condition code mask in response to the decode identification of a conditional instruction; and

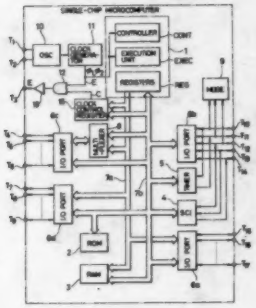
(b) means for analyzing the operands associated with a condition code setting instruction during pipeline execution of concurrent instruction execution and instruction decode cycles of said condition code setting instruction and conditional instruction, respectively, the provide a condition code result upon conclusion of the instruction decode cycle of said conditional instruction, said analyzing means including means for concurrently generating a plurality of digit subterms of the operands associated with said condition code setting instruction and means, responsive to said identification control signal, for selectively combining said digit subterms and the conditions code mask provided in response to the decode of said conditional instruction to provide said condition code result, wherein each said digit subterm of each said data operand includes two or more data bits wherein the operands associated with said condition code setting instruction include upper and lower operands that each include a plurality of data digits and wherein said concurrently generating means generates upper and lower sets of said digit subterms from said upper and lower operands, respectively.

4,967,352

DATA PROCESSOR IN WHICH EXTERNAL SYNC SIGNAL MAY BE SELECTIVELY INHIBITED

Haruo Keida, Tokorozawa; Takashi Tsukamoto, and Nobutaka Nagasaki, both of Kodaira, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan

Continuation of Ser. No. 894,841, Aug. 8, 1986, abandoned. This application Aug. 9, 1988, Ser. No. 230,047
Claims priority, application Japan, Aug. 23, 1985, 60-184207
Int. Cl.[5] G06F 13/00, 1/04
U.S. Cl. 364—200 15 Claims



1. A microcomputer formed in one semiconductor chip, said microcomputer comprising:

a bus;

a microprocessor having data input/output terminals coupled to said bus;

a first external terminal which is coupled to said bus and at which a signal to be fed from outside of said microcomputer is received;

a second external terminal which is adjacent to said first external terminal;

a sync signal generation means coupled to said second external terminal via a gate for generating a sync signal for synchronously operating a memory device externally coupled to said microcomputer; and

means for designating whether said microcomputer is to operate in a single-chip mode as a microcomputer system by itself or in an expansion mode as a microcomputer system in cooperation with the memory device and for applying a control signal to a control terminal of said gate indicating one or the other of said modes, said gate being controlled by said control signal so that said sync signal is inhibited from being supplied to said second external terminal when said gate receives at the control terminal thereof a control signal indicating that said microcomputer is to operate in said single-chip mode, and said sync signal is supplied to said second external terminal when said gate receives at the control terminal thereof a control signal indicating that said microcomputer is to operate in said expansion mode;

wherein said memory device is connected to both said first and second external terminals so as to operate synchronously with said microprocessor during said expansion mode.

4,967,353

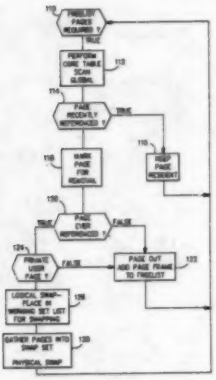
SYSTEM FOR PERIODICALLY REALLOCATING PAGE FRAMES IN MEMORY BASED UPON NON-USAGE WITHIN A TIME PERIOD OR AFTER BEING ALLOCATED

Larry B. Brenner, Stone Ridge, and Paul W. VanLeer, Highland, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 19,916, Feb. 25, 1987, abandoned. This application Aug. 3, 1989, Ser. No. 390,474

Int. Cl.[5] G06F *12/06*

U.S. Cl. 364—200 12 Claims



1. A method for managing memory of a computer system having memory, storage, and one or more processors and configured to process a plurality of tasks originated by a plurality of computing entities, wherein said memory is divided into a plurality of page frames, each page frame containing a page of data, and wherein one or more of said page frames is assigned to each of said plurality of tasks of said computing entities and any access by said computing entities to said assigned page frames is recorded with each of said page frames, wherein said method is performed by a task processed by said computer system, the method comprising the steps of:

examining each of said page frames periodically to determine whether said page frame has been recently accessed by said computing entity task assigned said page frame;

performing the following steps for each page frame not recently accessed:

determining whether said page frame has been accessed since being assigned to said task;

transferring the page of data contained in said page frame to said storage and making said page frame available for reassignment, if said page frame has not been accessed since being assigned;

collecting the page of data contained in said page frame into a set with data from previously collected page frames assigned to a given computing entity, if said page frame has been accessed since being assigned; and

transferring to said storage, when a number of page frames collected into said set reaches a threshold of at least two page frames, said pages of data collected in said set and making said page frames comprising said set available for reassignment.

4,967,354

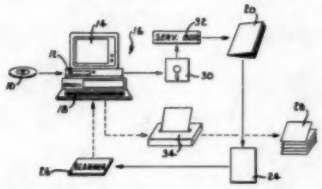
METHOD OF PREPARING CUSTOMIZED WRITTEN EXAMINATIONS

William W. Buchanan, Arlington, Va., assignor to Tescor, Inc., Reston, Va.

Filed Jun. 18, 1987, Ser. No. 63,504

Int. Cl.[5] G09B *5/02, 7/00*

U.S. Cl. 364—419 4 Claims



1. A method for formulating customized educational tests at a plurality of different sites remote from each other, said method comprising the steps of:

assembling at a service bureau a plurality of statements of learning objectives which are linked to previously validated test questions for each subject category which the tests may cover;

storing the objective statements and test questions in encoded form on a storage medium from which the questions may be retrieved;

providing at each site a visual monitor on which the objectives and test questions may be displayed;

using the storage medium to display on the monitor at each site the objectives and questions in categories selected at the site;

selecting at each site one or more objectives and questions from each category displayed on the monitor; and

printing for each site a test booklet containing only the questions selected at the site, whereby each test booklet contains questions selected at the site at which type booklet is to be used, said printing step comprising recording questions selected at each site on a storage device which stores the selected questions in magnetically encoded form, transporting each storage device to a service bureau, retrieving the selected questions from each storage device at the service bureau to which it is transported, printing the questions from each storage device in a test booklet at the service bureau, and furnishing to each site the test booklet which contains the questions selected at the site.

4,967,355

METHOD FOR CONTROLLING SWITCHING OVER OF SPEED STAGES OF TRANSMISSION WITH PRESETTING OF DUE PERIOD

Kunihiro Iwatsuki, and Hiroji Taniguchi, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 6, 1988, Ser. No. 215,538

Claims priority, application Japan, Jul. 9, 1987, 62-1711842

Int. Cl.[5] B60K *41/18, 41/04;* F16H *5/28*

U.S. Cl. 364—424.1 7 Claims

1. A method for controlling switching over of speed stages of an automatic transmission for a vehicle of the type having a first and second transmission for a vehicle of the type having a first and second transmission unit each having an input rotational member, an output rotational member, at least one intermediate rotational member operable to transmit rotational power between said input rotational member and said output rotational member and a servo actuator for selectively braking said intermediate rotational member or rotationally connecting said intermediate rotational member with another one of said rotational members and independently operable to provide a

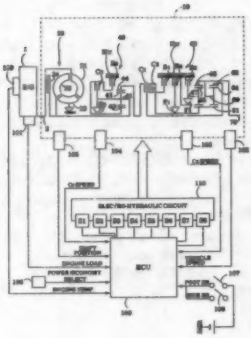
plurality of gear ratios between said input rotational member and said output rotational member, said first and said second transmission unit being connected in series so as to provide a plurality of speed stages by various combinations of gear ratios of said first and said second transmission unit, comprising the steps of:

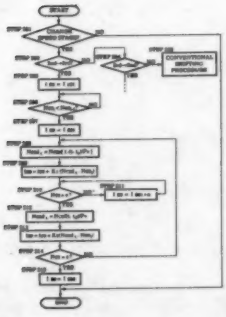
detecting operating conditions of the vehicle including engine load and vehicle speed by detecting means therefor;

detecting rotational speed of said intermediate rotational member in said first transmission unit by a detecting means therefor;

detecting rotational speed of said intermediate rotational member in said second transmission unit by a detecting means therefor;

determining switching over of speed stages of said transmission based upon the operating conditions of the vehicle including engine load and vehicle speed detected by said vehicle operating condition detecting means;





determining a period during which the switching over of speed stages of said transmission is to be completed based upon the operating conditions of the vehicle including engine load and vehicle speed detected by said vehicle operating condition detecting means; and

controlling operating of said servo actuators in said first and said second transmission unit based upon a coordination of respective rotational speeds of said intermediate rotational members in said first and said second transmission unit detected by said intermediate rotational member rotational speed detecting means for said first and said second transmission unit and said computed period so that the switching over of said first and second transmission unit are respectively completed with the end of said period.

4,967,356

CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION PRODUCING SHOCK-FREE SHIFT

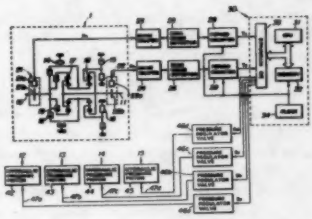
Yasushi Mori, Yokohama, Japan, assignor to Nissan Motor Company Limited, Yokohama, Japan

Filed Nov. 25, 1986, Ser. No. 934,867

Claims priority, application Japan, Nov. 29, 1985, 60-267441

Int. Cl.[5] B60K *41/06, 41/11;* G06F *15/20*

U.S. Cl. 364—424.1 **14 Claims**



1. A control system for an automatic transmission including a one-way clutch and a friction element, the automatic transmission being shiftable from one speed ratio to another speed ratio by increasing actuating hydraulic pressure applied to the friction element and causing the one-way clutch to overwheel, thus being released, the control system comprising:

means for determining the instant when the one-way clutch is overwheeled and thus released during a shift operation when the transmission shifts from the one speed ratio to the another speed ratio; and

means for regulating actuating hydraulic pressure applied to the friction element such that aid actuating hydraulic pressure applied to the friction element is held at a fixed magnitude after said determining means has determined said instant, said fixed magnitude being not less than the magnitude of the actuating hydraulic pressure applied to the friction element when said determining means determines said instant.

4,967,357

CONSTANT SPEED HOLDING APPARATUS

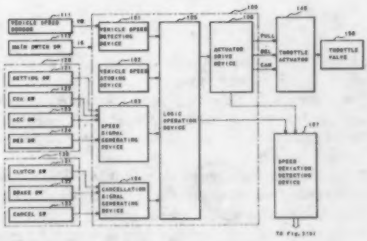
Munehiko Mimura; Takumi Tatumi; Yasuo Naito, and Kazuyori Katayama, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,046

Claims priority, application Japan, Jul. 2, 1987, 62-167178

Int. Cl.[5] B60K *31/10, 41/18*

U.S. Cl. 364—426.04 **4 Claims**



1. A constant speed holding apparatus comprising:

a vehicle speed sensor which outputs a signal indicating an actual vehicle speed;

cruise conditions setting means for setting cruise conditions including a target vehicle speed to be maintained;

cancellation conditions detecting means for detecting conditions for cancellation of said cruise conditions;

a throttle actuator for controlling a throttle opening of an engine;

constant speed cruise control means for driving said throttle actuator to perform constant speed cruise control in order to maintain said target vehicle speed on the basis of the signal outputted from said vehicle speed sensor which indicates the actual vehicle speed and on the basis of the cruise conditions set by said cruise conditions setting means;

speed deviation detecting means for detecting when a deviation of said actual speed from said target speed is smaller than a predetermined minute value;

a continuous variable transmission disposed in a power train for power transmission from said engine;

cruise information detecting means for detecting cruise information including said throttle opening; and

continuous variable transmission controlling means performing variable speed ratio control of said continuous variable transmission to maintain said target cruise speed on the basis of said cruise information detected by said cruise information detecting means, and upon detection that said deviation is smaller than said predetermined minute value, acting to maintain the variable speed ratio of said continuous variable transmission at an existing variable speed ratio.

4,967,358

SYSTEM AND METHOD FOR AUTOMATICALLY CONTROLLING A VEHICLE SPEED TO A DESIRED CRUISING SPEED

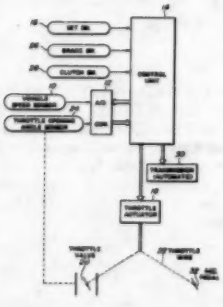
Yoshiyuki Etoh, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 8, 1988, Ser. No. 241,453

Claims priority, application Japan, Sep. 11, 1987, 62-227955

Int. Cl.[5] B60K *31/04*

U.S. Cl. 364—426.04 **11 Claims**



4. A system for automatically controlling a vehicle speed to a desired cruising speed, comprising:

(a) first means for detecting an instantaneous vehicle speed;

(b) second means for setting a target vehicle speed at which the vehicle cruises based on said detected instantaneous vehicle speed;

(c) third means for adjusting a variable of the engine output controlling mechanism of a vehicular engine so that the instantaneous vehicle speed coincides with the target vehicle speed, the variable having a characteristic such that an engine output torque becomes substantially constant when the variable exceeds a predetermined limit, said third means comprising:

fifth means for deriving an integral error ϵ_I between the instantaneous vehicle speed and target vehicle speed;

sixth means for deriving a proportional error ϵ_P between the instantaneous vehicle speed and vehicle speed before one control period;

seventh means for deriving the adjusted variable $\phi\eta$ on the basis of the integral and proportional errors;

eighth means for detecting an instantaneous variable of the engine output controlling mechanism;

ninth means for deriving a target variable of the engine output controlling mechanism from the adjusted variable $\phi\eta$ derived by the seventh means and the instantaneous variable η detected by the eighth means; and

tenth means for activating the engine output controlling mechanism so as to adjust the instantaneous variable to the target variable derived by the ninth means; and

(d) fourth means for inhibiting the automatic vehicle speed control when the adjusted variable falls in a range in which the engine output torque becomes substantially constant.

4,967,359

AUTOMOTIVE SUSPENSION CONTROL SYSTEM WITH ROAD-CONDITION-DEPENDENT DAMPING CHARACTERISTICS

Fukashi Sugasawa; Ken Ito, both of Yokohama; Tohru Takahashi, Yokosuka; Sadahiro Takakashi, Yokosuka, and Takashi Fujishiro, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

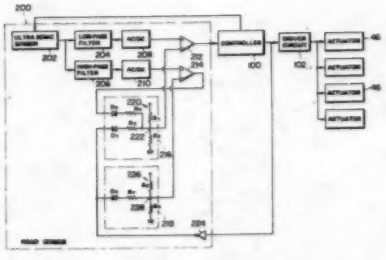
Continuation of Ser. No. 691,531, Jan. 15, 1985, Pat. No. 4,770,438. This application Feb. 19, 1988, Ser. No. 157,790

Claims priority, application Japan, Jan. 20, 1984, 59-8196; Jan. 20, 1984, 59-8199

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[5] B60G *17/08*

U.S. Cl. 364—424.05 **1 Claim**



1. A suspension control system for an automotive vehicle comprising:

a damper means interpositioned between a vehicle body and a road wheel for absorbing, at least in part, relative displacement between the vehicle body and road wheel, said damper means having damper characteristics selectably variable between a soft mode and a hard mode;

a sensor producing a sensor signal, the amplitude and frequency of which correspond to the amplitude and frequency of vibrations of the vehicle body;

a filter means receiving said sensor signal and outputting a filter signal representative of the amplitude of a specific frequency of vibrations of the vehicle body;

a comparator means receiving said filter signal and comparing the amplitude thereof with a reference value, said comparator means producing a comparator signal when the filter signal value is greater than the reference value; and

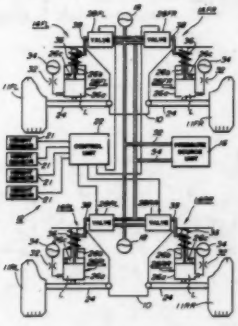
a controller associated with said damper means for normally operating the latter in said soft mode, said controller being responsive to said comparator signal to operate said damper means in said hard mode.

4,967,360

ACTIVELY CONTROLLED SUSPENSION SYSTEM WITH POWER SUPPLY CONTROL

Yukio Fukunaga; Naoto Fukushima; Yohsuke Akatsu; Sunao Hano, and Masaharu Sato, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 3, 1988, Ser. No. 266,763
Claims priority, application Japan, Nov. 5, 1987, 62-280071
Int. Cl.[5] B60G *17/015*
U.S. Cl. 364—424.05 **15 Claims**



1. A control system for controlling suspension characteristics in an automotive suspension system, comprising:

a cylinder disposed between a vehicle body and a suspension member which rotatably supports a road wheel, said cylinder defining a variable pressure working chamber filled with a pressure medium for generating a damping force resisting against relative displacement between said vehicle body and said suspension member;

a pressure source circuit means connected to said working chamber for supplying pressure medium and including a pressure source feeding pressurized pressure medium through said pressure source circuit means;

a pressure control valve disposed between said pressure source and said working chamber and variable of valve position between a first mode for increasing pressure of said pressure medium within said working chamber, a second mode for decreasing pressure in said pressure medium within said working chamber, and a third mode for maintaining said pressure in said pressure medium within said working chamber constant;

a sensor means for monitoring vehicle body attitude change for producing a vehicle body attitude change indicative sensor signal;

a controller means for deriving a control signal on the basis of said vehicle body attitude change indicative signal for operating said pressure control valve to one of said first, second and third mode to adjust the pressure of said pressure medium in said working chamber for suppressing attitude change of the vehicle body;

an electric power supply circuit connecting said controller means to an electric power source, said electric power supply circuit including a power main switch for controlling power supply for said controller means; and

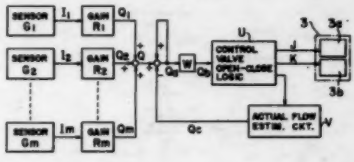
means, responsive to switching of said power main switch form a power supply position to a power shut-off position, for maintaining power supply for said controller means for a given period of time.

4,967,361

ACTIVE-SUSPENSION CONTROLLING SYSTEM OF VEHICLES

Katsuyoshi Kamimura, Sano; Saiichiro Oshita, Ota; Atsushi Mine, Otzumi; Yutaka Hiwatashi, Ota, and Toshihiro Konno, Ota, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 181,650, Apr. 14, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 404,049
Claims priority, application Japan, Apr. 17, 1987, 62-94951
Int. Cl.[5] B60G *13/00*
U.S. Cl. 564—424.05 **6 Claims**



1. A control system for controlling an active suspension system of a vehicle, said active suspension system having a fluid suspension system made up of a plurality of suspension units and containing a sealed-in fluid, sensors for detecting motions of the suspension units, a controller operating in response to sensor signals from said sensors to determine a desired flow quantity of the fluid to be charged into or discharged from the suspension units and to output command signals on the basis of said desired flow quantity, control valves operating in response to said command signals to undergo on-off operation thereby to cause the fluid to be charged into or discharged out from the suspension units, the improvement of said control system comprising:

a flow quantity estimation circuit for estimating the flow quantity of the fluid flowing through each control valve;

means for calculating a corrected desired flow quantity by adding the difference between said flow quantity thus estimated by the quantity estimation circuit and a preceding desired flow quantity to said desired flow quantity determined by said controller based on the sensor signals; and

means in response to the corrected desired flow quantity to generate and transmit said command signals for operating each control valve to undergo said on-off operation.

4,967,362

AUTOMATIC STEERING APPARATUS FOR CROP VEHICLE

Herman P. Schutten, Bayside, Wis.; Dwight B. Stephenson, Savage, and Oliver W. Johnson, Chaska, both of Minn., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jan. 30, 1989, Ser. No. 302,889
Int. Cl.[5] G06F *15/50*; A01D *34/00*
U.S. Cl. 364—424.07 **12 Claims**

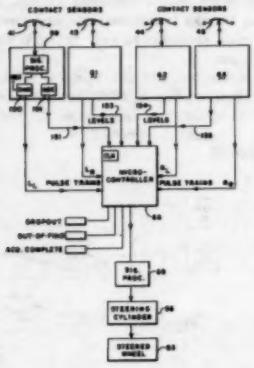
11. A guidance system that automatically steers a vehicle to track rows of spaced-aprt plants, comprising:

means for sensing the lateral locations of the rows relative to the vehicle and providing lateral information signals based thereon;

spaced-apart means on the vehicle contacting the plants for sensing the difference in the velocities at spaced-apart plant rows and providing feedback signals, said feedback signals being affected by the angular rate of turning of the vehicle;

steering command means receiving said lateral information signals and said feedback signals and responsive thereto to

provide command signals for steering the vehicle to follow a course tracking said rows;



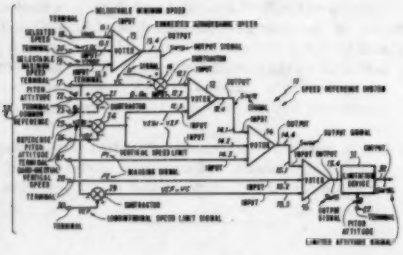
steering-actuator means receiving said command signals, and responsive thereto for steering the vehicle.

4,967,363

SPEED REFERENCE SYSTEM FOR PILOTING AN AIRCRAFT

Jean L. Bonafe, Toulouse, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Dec. 21, 1988, Ser. No. 287,288
Claims priority, application France, Dec. 22, 1987, 87 17932
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—427 **11 Claims**



1. A speed reference system for the piloting of an aircraft, said system comprising:

a first voter (12) receiving at its inputs electrical signals respectively representative of a first difference between a desired speed selected by the pilot (VSEL) and the real aerodynamic speed (VC) of the aircraft, of a second difference (θ—θc) between the real pitch attitude (θ) of said aircraft and a reference pitch attitude (θc), and of a third difference (VZBI-VZF) between the real baro-inertial vertical speed (VZBI) of said aircraft and a vertical speed lower limit (VZF);

a second voter (14) receiving at its inputs the output signal (SW12) of said first voter (12) and the signal (VZBI-VZF) representative of said third difference and delivering at its output that of its two input signals which is the smaller; and

a third voter (15) receiving at its inputs the output signal (SW14) of said second voter (14) and the signal representative of a fourth difference (VCF-VC) between an aerodynamic speed lower limit (VCF) and said real aerodynamic speed (VC), said third voter delivering at its output that of its two input signals which is the greater,

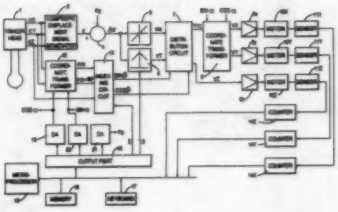
the output signal from said third voter being used to control the instantaneous speed of said aircraft relative to the instantaneous stall speed of the said aircraft.

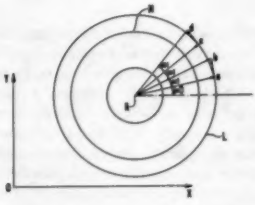
4,967,364

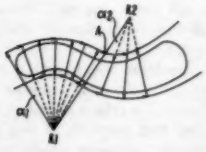
ARBITRARY-DIRECTION TRACER CONTROL SYSTEM

Etuo Yamazaki, and Hitoshi Matsuura, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Continuation of Ser. No. 377,736, Jul. 10, 1989, abandoned, which is a continuation of Ser. No. 46,982, Apr. 3, 1987, abandoned. This application Dec. 21, 1989, Ser. No. 453,260
Claims priority, application Japan, Aug. 7, 1985, 60-173889
Int. Cl.[5] G05B *19/36*
U.S. Cl. 364—474.03 **8 Claims**







1. An arbitrary-direction tracer control system for controlling movement of a model and a tracer head relative to each other at an arbitrary angle to an X-axis, comprising:

input means for inputting a coordinate value of a reference point;

setting means for setting first and second tracing stroke limits where tracing feed is to be returned; and

control means for controlling movement of the tracer head relative to the model from a first point at the first tracing stroke limit to a second point at the second tracing stroke limit along a first path which passes through the reference point and has a first angle to the X-axis, for controlling mvoement of the tracer head upon reaching the second tracing stroke limit to perform a first pick feed in a direction perpendicular to the first path until a third point is reached, for controlling, upon reaching the third point,

movement of the tracer head to a fourth point at the first tracing stroke limit along a second path colinear with a line through the third point and the reference point and having a first predetermined angle to the direction of the first pick feed, for controlling movement of the tracer head upon reaching the first stroke limit to perform a second pick feed in a direction perpendicular to the second path until a fifth point is reached and for controlling, upon reaching the fifth point, movement of the tracer head to the second tracing stroke limit, along a third path colinear with a second line through the fifth point and the reference point and having a second predetermined angle to the direction of the second pick feed.

4,967,365

METHOD AND APPARATUS FOR ADAPTIVE CONTROL OF THE TRAJECTORY OF A WORKING PROCESS

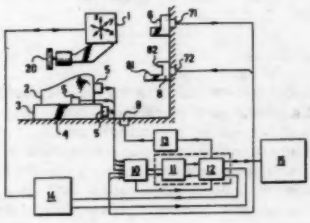
Jan Hampl; Oldrich Taraba, and Jiri Valenta, all of Prague, Czechoslovakia, assignors to SKODA koncern Plyzen První brnenská strojírna koncerno podnik, Brno, Czechoslovakia

Filed Dec. 9, 1988, Ser. No. 282,179

Claims priority, application Czechoslovakia, Dec. 12, 1987, PV 9095087

Int. Cl.[5] G06F *15/46*; G06G *7/64*

U.S. Cl. 364—474.15 **5 Claims**



1. A method for the adaptive control of a path followed by a grinding working tool during a working process on a workpiece in order to maintain technological parameters of this working process wherein, during the course of the working process an acoustic transmission is generated in response to contact of the working tool with the workpiece, said method comprising:

determining the dimensions of the working tool by coordinates of a positioning device at the moment of contact of the working tool with a hard non-wear reference member having pre-established coordinates to remove material from the working tool,

identifying the workpiece in a working space of the machine tool and determining the dimensions of the workpiece using acoustical signals,

calculating, based on the identification of the workpiece in the working space and on a predetermined mathematic model, an optimum starting path for the working tool of the working process,

monitoring the working process using acoustical signals, a control apparatus responsive to the signals and technological parameters and based on a comparison between the predetermined actual technological parameters, establishing at least one new path for the working tool,

measuring, as required, when there is wear of the working tool, the actual dimensions of the working tool using the determining step and based on this measurement, providing a correction of the working tool and thereafter determining a new path of movement for the working tool, and repeating, as required, the aforementioned operations over the course of the working process, as often as is necessary to obtain a required result while still maintaining the technological parameters.

4,967,366

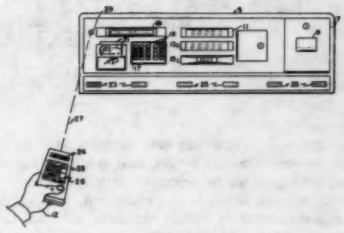
INTEGRATED GASOLINE DISPENSER AND POS AUTHORIZATION SYSTEM WITH UNATTACHED PIN PAD

David L. Kaehler, Greensboro, N.C., assignor to Gilbarco Inc., Greensboro, N.C.

Filed Mar. 6, 1989, Ser. No. 322,221

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—479 **5 Claims**



1. In a gasoline station fueling island, a gasoline dispenser head including a point-of-sale authorization (POS) terminal, the POS terminal including a message display for operational prompting, a keypad, a card reader for reading customer's credit cards, and a printer for providing transaction receipts, wherein the improvement comprises:

portable PIN Pad means for providing in an attendant-activated mode of operation, means for a customer to privately and confidentially enter the customer's personal identification data or number (PIN) outside the view of the attendant, the PIN being encrypted in said PIN Pad means, whereafter the customer hands the PIN Pad means to the attendant;

transmission means included in said PIN Pad means for permitting said attendant to remotely transmit the customer's encrypted PIN number to said POS terminal;

first receiving means included in said POS terminal for receiving and decoding the encrypted PIN data transmitted from said PIN Pad means;

controller means included in said POS terminal and connected to said first receiving means, for receiving said decoded encrypted PIN data from said first receiving means, and transmitting the same to a master controller of said gasoline station;

said controller means further including second receiving means for receiving back from said master controller, a control signal indicating whether the PIN number is authorized or denied;

display means located on said POS terminal, connected to said second receiving means, for receiving said control signal therefrom and visually indicating to a "user" whether authorization is confirmed or denied; and

wherein said controller means of said POS terminal further includes for use in a customer activated mode of operation, third receiving means for receiving directly from said keypad of said POS terminal, PIN data entered into said keypad by said customer, for encrypting and transmitting the same to said master controller.

4,967,367

SYNTHETIC NETLIST SYSTEM AND METHOD

Jacques-Oliver Piednoir, Valbonne, France, assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Nov. 21, 1988, Ser. No. 273,479

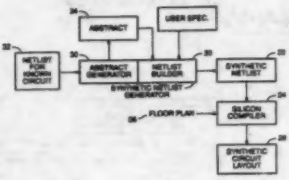
Int. Cl.[5] G06F *15/60*

U.S. Cl. 364—489 **8 Claims**

1. A synthetic netlist generator, comprising:

abstract means for receiving a specified netlist representing a known circuit, said specified netlist including a represen-

tation of the interconnections between a specified set of circuit elements in said known circuit, and for generating an abstract representing the circuit elements used, the distribution of circuit elements and the complexity of the interconnections between said circuit elements in said known circuit; and



netlist means for receiving said abstract and generating a new, synthetic circuit netlist, said synthetic circuit netlist representing a set of selected circuit elements with selected interconnections therebetween, said set having a specified number of circuit elements, wherein the circuit elements used, the distribution of said selected circuit elements and the complexity of the selected interconnections therebetween are in accordance with said abstract.

4,967,368

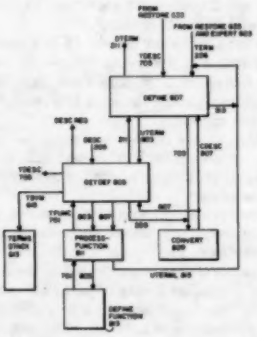
EXPERT SYSTEM WITH KNOWLEDGE BASE HAVING TERM DEFINITION HIERARCHY

Richard W. Bolling, Brookline, N.H.; Louis P. Tychonievich, Fallston, Md.; Geoffrey E. Margrave, Lexington, Mass.; David F. Shannon, Nashua, and Eric S. Rustici, Londonderry, both of N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.

Continuation-in-part of Ser. No. 30,250, Mar. 24, 1987, Pat. No. 4,916,633, which is a continuation of Ser. No. 766,860, Aug. 16, 1985, abandoned. This application Jun. 5, 1989, Ser. No. 371,434

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **20 Claims**



1. A digital computer system operable as an expert system, said computer system comprising:

storage means to store a knowledge base including hierarchically-defined terms and their definitions, the corresponding definition of each term defining its respective term using the value of one or more terms, each of whose definitions is at a lower level of the hierarchy, and/or using one or more term-independent values which do not depend on the value of a term; and

processing means for receiving commands from a user of the system, for producing inference commands in response to said user commands, for interrogating said storage means in response to said commands to obtain the definition of a given term, and for computing the value of said given term from its corresponding definition by obtaining the value of any term and any term-independent value in the corresponding definition,

said system employing said computed value to produce an expert response to said user.

4,967,369

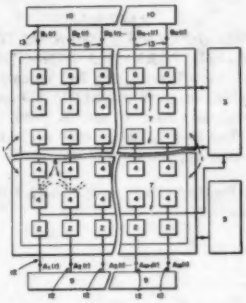
VARIABLE CAPACITY TRANSMISSION MEDIUM

Alexander N. Jourjine, P.O. Box 425, Cambridge, Mass. 02142

Filed Jun. 7, 1988, Ser. No. 203,414

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **6 Claims**



2. A random code neural network for information correlation and discrimination of plural inputs comprising:

an array of information transmission cells for receiving the plural inputs, each information transmission cell comprising a transmission cell and a memory cell, the information transmission cells communicating with each other by emission and absorption of signals modulated according to random binary codes, the binary codes from each information transmission cell being non-zero within activation windows of a pulse length, the pulse length being within a longer code length;

each transmission cell comprising means for measuring energy flux in an input and means for learning by updating timings of random code to increase the transmission capacity of the random code;

each memory cell comprising means for measuring energy flux in an input and means for learning by updating timings of random code at a speed which is low relative to the speed of updating timings in the transmission cell to increase the transmission capacity of the random code, and

means for monitoring the learning of the array of information transmission cells.

4,967,370

ROBOT AND SENSOR ERROR DETERMINATION SYSTEM

Howard K. Stern, Greenlawn, and Samson L. Schmuter, New York, both of N.Y., assignors to Robotic Vision Systems, Inc., New York, N.Y.

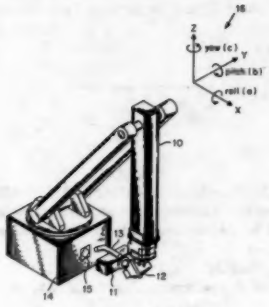
Filed Oct. 21, 1988, Ser. No. 260,862

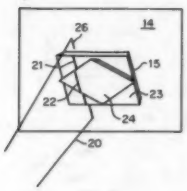
Int. Cl.[5] G05B *19/00*

U.S. Cl. 364—513 **10 Claims**

1. A method for determining robot positioning errors and sensor location errors, comprising the steps of: placing a reference object within a work volume of a robot carrying a sensor capable of making three dimensional measurements, said reference object having a symmetrical shape about an axis, said shape unambiguously defining location and orientation of said object for its small deviations relative to the robot position; measuring said reference object from a single predetermined robot position at fixed sensor orientations rotationally incre-

mented about a robot axis that is substantially aligned to said axis of symmetry; recording said measurements in a memory, said measurements forming a baseline measurement set; repeat-





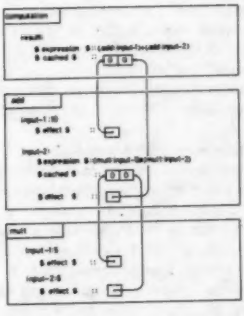
ing said measurement step at a later time and producing another measurement set; and processing said baseline set and said another measurement set to determine separately robot positioning errors and sensor location errors.

4,967,371

METHOD AND APPARATUS FOR INFERENCE

Tetsuro Muranaga, and Hideyuki Tsutsumitake, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 17, 1988, Ser. No. 272,400
Claims priority, application Japan, Nov. 20, 1987, 62-293455
Int. Cl.[5] G09B *7/12*; G06F *12/00, 7/00*
U.S. Cl. 364—513 **6 Claims**



1. An apparatus for inference, comprising:

knowledge base means containing frames comprised of :

slots and slot values for storing knowledge on objects of interest and representing categorized attributes, each object being represented by one of the frames, each categorized attribute being represented by one of the slots in the frame, a particular attribute value corresponding to the object being represented by one of the slot values in the frame;

procedure information accompanying each slot which indicates a procedure for deriving a slot value of a slot from other slot values;

pointer information for indicating the slots related to each other by the procedure indicated by the procedure information; and

sign information accompanying each slot for indicating validity of the slot value currently given; and

knowledge base managing means for managing the knowledge base means including:

means for deriving a slot value in accordance with the procedure indicated by the procedure information when the slot value is missing and when the slot value is indicated by the accompanying sign information as invalid;

means for changing the indication of the sign information accompanying the slots which are indicated by the pointer information as being related to the slot whose slot value is derived by the deriving means; and

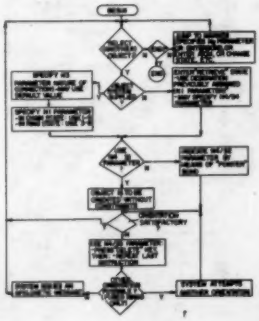
means for caching in the slot value derived by the deriving means to the knowledge base means.

4,967,372

AUTOMATIC ORIENTATION AND INTERACTIVE ADDRESSING OF DISPLAY

Alfred P. Feldman, Columbia, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed May 16, 1986, Ser. No. 863,981
Int. Cl.[5] G06F *15/66*
U.S. Cl. 364—518 **21 Claims**



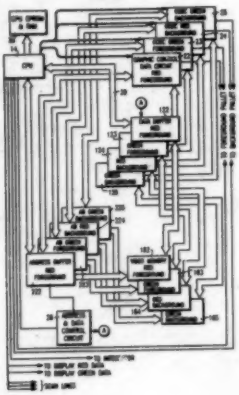
1. A computer-operated method for minimizing the number of keystrokes required to be entered at a data entry keyboard to display two-dimensional figures on a display controlled by a computer, which display is sub-divided into multiple two-dimensionally arrayed grid locations, said figures being made up of plural individual segments to be entered from said keyboard and displayed in individual display grid locations, some of said segments taking the form of alphanumeric characters corresponding to keys of said keyboard, others of said segments taking the form of directional symbols having forward and rearward ends and which, when displayed, link displayed alphanumeric characters and extend in respective horizontal, vertical and diagonal directions on said display, the method comprising the steps of:

(a) entering into the computer signals representing individual graphic figure segments actuated in succession on said keyboard;

(b) storing within said computer a stored array of entered characters with locations corresponding to respective grid locations on said display;

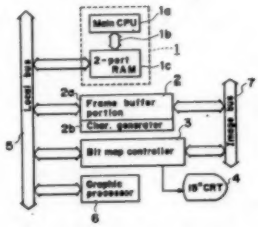
(c) establishing a movable cursor grid location on said display;
(d) providing a plurality of selectable operating states for said computer, in each of which said plural operating states said component will interpret key entries on said keyboard differently;
(e) for each of said plural operating states, providing a protocol of preferred display element orientations each having an order of preference;
(f) storing within said computer a plurality of display elements each having a plurality of permissible orientations;
(g) in response to the entry of a display element recall code, examining in said computer said entered display element recall code and determining the identity of a corresponding stored display element to be recalled;
(h) recalling said identified stored display element;
(i) applying said respective protocol of permissible display element orientations to said identified recalled display element; and
(j) orienting the recalled display element relative to a grid location on said display according to said respective protocol.

4,967,373
MULTI-COLORED DOT DISPLAY DEVICE
Eilon Ginsburg, Ramat-Gan, Israel, assignor to COMFUTURE, Visual Information Management Systems, Ramat-Gan, Israel
Filed Mar. 16, 1988, Ser. No. 169,039
Int. Cl.[5] G06F *3/00*
U.S. Cl. 364—518 **7 Claims**



1. A device for controlling a multi-color dot matrix display device comprising:
a microprocessor;
a plurality of address buffers each coupled to said microprocessor;
a plurality of data buffers each coupled to said microprocessors;
a plurality of video memories planes wherein each video memory plane has an associated address buffer and an associated data buffer;
a plurality of graphic control data circuits wherein each graphic control data circuit is coupled to an associated data buffer and address buffer for receiving from said video memories planes a pattern to be displayed on said dot matrix display;
address and data control circuit coupled to said microprocessor, said address buffers and said data buffers for switching access to said plurality of video memories planes from said microprocessor to said plurality of graphic control data circuits; and
display driving means coupled to said plurality of graphic control data circuits for converting said received, pattern into electrical signals for driving said dot matrix display.

4,967,374
CHARACTER DRAWING METHOD
Akihiro Nomura, Yamatokoriyama, and Toshimi Kiyohara, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jul. 25, 1988, Ser. No. 223,615
Claims priority, application Japan, Jul. 31, 1987, 62-193160
Int. Cl.[5] G06F *3/14*
U.S. Cl. 364—518 **7 Claims**



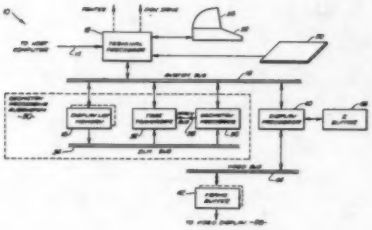
5. A character drawing system in which processor functions are distributed between multiple processors to create an efficient character drawing system for creating drawings of characters, said system comprising:
first storage means for storing entered character codes, corresponding to characters on a page of information, which are desired to be drawn;
first processor means, connected to said first means for storing, for sequentially assigning display parameters to each of said stored codes, said first processor means thereby creating a display table by sequentially entering each of said character codes and corresponding display parameters into said first storage means;
said first processor means further setting a flag to 1 for each of said character codes upon entering of said character codes into said display table;
second processor means, operatively connected to said first storage means, for continually checking each of said display table flags;
said second processor means sequentially transforming each of said character codes and said corresponding display parameters into a second storage means upon recognizing each of said display flags have been set to 1;
second storage means for sequentially storing said written character codes and corresponding display parameters;
character generating means, connected to said second storage means, for sequentially generating characters from said stored character codes and corresponding display parameters;
display means, operatively connected to said character generating means, for sequentially displaying each of said generating characters on said display means, thereby creating an efficient character drawing system wherein said first and second processor means sequentially perform character drawing operations continuously.

4,967,375

FAST ARCHITECTURE FOR GRAPHICS PROCESSOR

Anthony J. Pelham, Port Orange; Walter R. Steiner, and William S. Didden, both of Ormond Beach, all of Fla., assignors to Star Technologies, Inc., Sterling, Va.

Filed Mar. 17, 1986, Ser. No. 840,459
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—518 18 Claims



1. A graphics processor for displaying objects and for use with a host processor, comprising:

a system bus comprising a plurality of control, data and address lines;

a unidirectional read bus comprising a plurality of data lines;

a memory coupled to the system bus and the read bus and having a plurality of memory locations, each location having an address, said memory locations for storing segments of graphics data which represent objects to be displayed, wherein the segments of graphics data are arranged in an hierarchical arrangement wherein the graphics data of each segment includes at least one pointer representing the address of another segment;

first processing means coupled to the system bus and responsive to the host processor, for writing the segments of graphics data over the system bus into the memory and for supplying a starting segment address; and

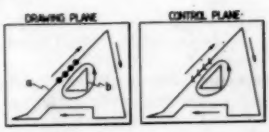
second processing means coupled to the system bus and the read bus and responsive to the first processing means, for sequentially reading over the read bus graphics data stored in the memory starting at the segment address supplied by the first processing means and for displaying images of objects represented by the graphics data read by the second processing means, said second processing means including means for reading a pointer from the memory and for reading the graphics data stored at the segment addresses represented by the read pointers.

4,967,376

METHOD FOR DISPLAYING CHARACTERS AND/OR FIGURES IN A COMPUTER GRAPHICS AND APPARATUS THEREOF

Koyo Katsura, Hitachioota, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 22, 1989, Ser. No. 354,986
Claims priority, application Japan, May 24, 1988, 63-126554
Int. Cl.[5] G06F *3/00*
U.S. Cl. 364—521 15 Claims



1. A method for displaying characters and/or figures in a computer graphic system, in which an outline or outlines of a character and/or figure to be displayed are drawn and then the painting thereof is effected, comprising the following steps:

step of drawing data (drawing data) of pixels forming the outline or outlines in dots of a first memory space defined in storage means of the computer graphic system dot by dot;

step, executed synchronously with drawing of drawing data of a pixel of the outline or outlines in a dot of the first memory space, of writing data (control data) for controlling the painting in a corresponding dot of second memory space defined in the storage means of the computer graphic system; and

step of effecting the painting by scanning a predetermined area of the first memory space, in which area the outline or outlines are drawn, by a horizontal scanning line and carrying out the drawing of drawing data in dots of the first memory space, which exist on the horizontal scanning line, in accordance with the control data,

characterized in:

that the control data writing step writes a control data in the corresponding dot of the second memory space is written by one of three different kinds of the control data in accordance with the state that the pixel belongs to a left edge of the outline or outlines, a right edge thereof or neither of them; and

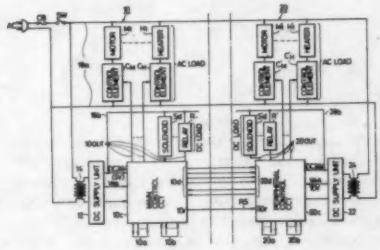
that the painting effecting step effects the drawing of drawing data in dots of the first memory space, which exist between dots corresponding to those dots of the second memory space which have the control data indicating the left edge and the right edge.

4,967,377

CONTROL SYSTEM USING COMPUTERS AND HAVING AN INITIALIZATION FUNCTION

Shunichi Masuda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 150,438, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 854,192, Apr. 21, 1986, abandoned, which is a continuation of Ser. No. 446,492, Dec. 3, 1982, abandoned. This application Dec. 20, 1989, Ser. No. 455,907
Claims priority, application Japan, Dec. 10, 1981, 56-197703; Dec. 10, 1981, 56-197704
Int. Cl.[5] G06F *1/24, 15/00, 13/10;* G03G *21/00*
U.S. Cl. 364—518 8 Claims



1. An image reproduction system, comprising:

an image reproducing apparatus;

a peripheral apparatus additionally attached to said reproducing apparatus;

first one chip computer means provided with a data memory, a processor and a memory storing a program for operation control of said peripheral apparatus;

second one chip computer means having a data memory, a processor and a memory storing a program for operation control of said image reproducing apparatus, for communicating data with said first one chip computer means;

first reset means for resetting said first one chip computer

means for a predetermined period of time in response to the power source being turned on, wherein said first reset means also resets said first one chip computer means during the period of time of initialization of said second one chip computer means in response to a control signal from said second one chip computer means which indicates the initialization of said second one chip computer means and said first reset means cancels the reset of said first one chip computer means in response to a control signal which indicates the completion of initialization of said second one chip computer means,

wherein said second one chip computer means clears its memory during the initialization.

4,967,378

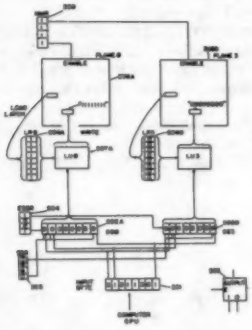
METHOD AND SYSTEM FOR DISPLAYING A MONOCHROME BITMAP ON A COLOR DISPLAY

Wesley O. Rupel, Bellevue, and Anthony C. Piscuili, Seattle, both of Wash., assignors to Microsoft Corporation, Redmond, Wash.

Filed Sep. 13, 1988, Ser. No. 244,450

Int. Cl.[5] G09G *1/16*; G06F *3/14*

U.S. Cl. 364—518 **17 Claims**



13. An apparatus for updating a multiplane bitmap memory using a single plane bitmap as input, the single plane bitmap having values 1 and 0 to represent two preselected colors, color1 and color0, respectively, the multiplane bitmap memory using the corresponding bits in each plane to form a multibit value designating the color in accordance with a preselected set of multibit color designations, the bitmaps having a corresponding logical unit and corresponding latch register for each plane of the multiplane bitmap, the apparatus comprising:

a. means for identifying the planes of the multiplane bitmap for which the preselected colors have common bit values;

b. means for setting all bits of the latch registers for each plane to the bit value of color0 for that plane;

c. means for logically exclusively ORing the value of the latch register with a value of 0 for each plane identified as having common bit values and with a byte of the single plane bitmap for the planes not identified as having common bit values to effect the update of the multiplane bitmap memory.

4,967,379

PROCESS FOR THE INK CONTROL OR REGULATION OF A PRINTING MACHINE BY COMPARING DESIRED COLOR TO OBTAINABLE COLOR DATA

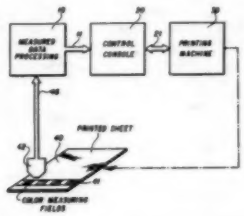
Hans Ott, Regensdorf, Switzerland, assignor to GRETAG Aktiengesellschaft, Regensdorf, Switzerland

Filed Dec. 5, 1988, Ser. No. 279,776

Claims priority, application Switzerland, Dec. 16, 1987, 4922/87

Int. Cl.[5] G01N *21/25*

U.S. Cl. 364—526 **29 Claims**



1. Process for the ink control or regulation of a printing machine with a colorimetric measuring system, whereby measuring fields on sheets printed by the printing machine are optically evaluated, in order to determine the color location of a measuring field in a coordinate system and to produce a regulating value for adjusting the color control elements of the printing machine by a coordinate comparison of a color deviation of the measuring field evaluated from a given desired color location, so that undesirable color deviations will become minimal on the sheet subsequently printed with a new ink control setting, comprising the steps of:

defining within the coordinate system a correction color space around a point defined by an actual color location measured on the measuring field using predetermined boundary densities and measured full tone densities;

replacing a predetermined desired color location situated outside the correction color space by an attainable desired color location on the boundary surface of the correction color space having a color deviation from the predetermined desired color location, with the components of said color deviation essential for the printing quality being minimal.

4,967,380

DUAL CHANNEL SIGNAL PROCESSOR USING WEIGHTED INTEGRATION OF LOG-RATIOS AND ION BEAM POSITION SENSOR UTILIZING THE SIGNAL PROCESSOR

Wieslaw J. Szajnowski, Guildford, United Kingdom, assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 97,500, Sep. 16, 1987, abandoned. This application Mar. 31, 1989, Ser. No. 333,770

Int. Cl.[5] G01K *1/08*; G21G *5/00*

U.S. Cl. 364—550 **25 Claims**

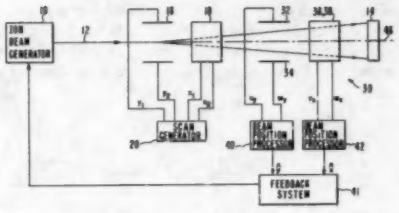
15. Signal processing apparatus for receiving electrical signal v(t) and w(t) from a pair of sensors and for determining an estimate of a parameter from said signals, said apparatus comprising:

a first channel for receiving one of said electrical signals and for conveying a representative of said one signal to a first sampling means;

a second channel for receiving the other of said electrical signals and for conveying a representative of said other signal to a second sampling means;

first sampling means connected to said first channel for sampling the representative conveyed by said first channel at prescribed intervals and for converting the representative to a digital sample denoted by v_i

second sampling means connected to said second channel for sampling the representative conveyed by said second channel at prescribed intervals and for converting the representative to a digital sample denoted by w_i,



means, connected to said sampling means, for providing a weighted log-ratio of the form

$$\alpha\left(\sum_{i=1}^{N} P_i \ln\left(\frac{|v_i|}{|w_i|}\right)\right)\Big/\left(\sum_{i=1}^{N} P_i\right),$$

where $|v_i|$ denotes the absolute value of v_i,

$|w_i|$ denotes the absolute value of w_i,

N is the number of sample pairs,

P_i is a weight determined by v_i and w_i, and α is a constant;

means, connected to said means for providing a weighted log-ratio, for deriving an estimate of said parameter; and

channel switching means, connected between said first channel and said second channel, for switching the sensed signals v(t) and w(t) between said first and second channels in first and second switch states during calculation of the estimate so that the estimate is independent of mismatch in the signal processing means.

4,967,381

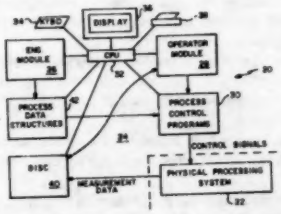
PROCESS CONTROL INTERFACE SYSTEM FOR MANAGING MEASUREMENT DATA

Leslie A. Lane, Santa Clara; Lynn V. Lybeck, Moss Beach; David S. Perloff, Sunnyvale, and Shoji Kumagi, Santa Clara, all of Calif., assignors to Prometrix Corporation, Santa Clara, Calif.

Division of Ser. No. 50,925, May 15, 1987, Pat. No. 4,873,623, which is a continuation-in-part of Ser. No. 864,024, May 16, 1986, Pat. No. 4,805,089, which is a continuation-in-part of Ser. No. 729,153, Apr. 30, 1985, Pat. No. 4,679,137. This application Jul. 6, 1989, Ser. No. 375,898

Int. Cl.[5] G01R *23/16*

U.S. Cl. 364—551.01 **15 Claims**



1. In a method of using a programmed digital computer to control the measurement, storage and analysis of a multiplicity of measurements, said computer having data storage means for storing measurement data, and means for controlling the operation of an apparatus coupled to said computer, said apparatus including means for performing a multiplicity of measurements and communicating the resulting measurement values to said computer, the steps of:

establishing a set of processes which can be run under the control of said computer, each process having a predefined set of process parameters which control the operation of said apparatus;

establishing a multiplicity of process definition data structures, including a measurement definition data structure within each process definition data structure;

establishing a set up program for interactively performing the steps of:

selecting one of said processes;

defining for said selected process, a subset of the measurements which said apparatus can perform, and storing a representation of the selected subset in said measurement definition data structure for said selection process; wherein said set up program includes means for defining different subsets of measurements for each selected process; and

establishing an operator process control program for enabling interactive computer controlled performance of the steps of:

selecting one of said processes;

running said selected process, and storing the measurement values conveyed by the apparatus to said computer in said data storage means;

wherein said processes each include means for accessing the corresponding measurement definition data structure and for controlling the operation of the apparatus so that only the measurements specified in said measurement definition data structure are performed and so that only the measurement values corresponding to the measurements specified in said measurement definition data structure are stored in said data storage means.

4,967,382

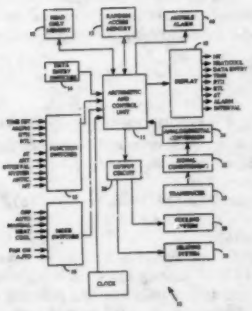
PROGRAMMABLE TIME VARYING CONTROL SYSTEM AND METHOD

Burness C. Hall, P.O. Box 1283, Dickinson, Tex. 77539

Filed Jan. 9, 1987, Ser. No. 1,915

Int. Cl.[5] G05D *13/32*; F23N *5/20*; H05B *1/02*

U.S. Cl. 364—557 **54 Claims**



1. A thermostat for generating control signals for a temperature modifying device comprising:

(a) means for generating a digital electrical signal representative of the ambient temperature on the thermostat;

(b) manually accessible means for storing a plurality of time/temperature schedules in a programmable digital memory, said schedules providing a digital electrical signal representative of desired temperatures for different times within the interval defined by each schedule;

(c) means for generating a digital electrical signal representative of time;

(d) comparator means having first and second inputs with one input coupled to said ambient temperature generator means;

(e) interface means coupled to said digital time generating means and operative to selectively one of the schedules to the second input of said comparator means; and

(f) means for coupling the output of said comparator means to said temperature modifying device.

4,967,383

OPERATIONAL CONDITION SETTING DEVICE FOR COMBINATION WEIGHING MACHINE

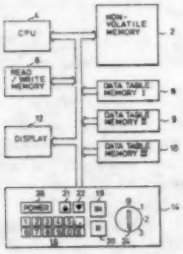
Takashi Hirano, Kobe; Michio Taguchi, Tatsuno, and Kazuhiro Nishide, Kobe, all of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Filed Jul. 1, 1988, Ser. No. 214,688

Claims priority, application Japan, Jul. 8, 1987, 62-170756

Int. Cl.[5] G01G *19/04*

U.S. Cl. 364—567 **16 Claims**



1. An operational condition setting device for a combination weighing machine whose operation is controlled with values of independent operational parameters which define an operating condition of the machine and which are registered independently and values of dependent operational parameters which are determined from said values of independent operational parameters, said device comprising means for inputting said values of independent operational parameters, first memory means for storing said input values of independent operational parameters, means for calculating values of dependent operational parameters from said stored input values, and means for registering said calculated values of dependent operational parameters.

4,967,384

HIGHLY ACCURATE WEIGHING SYSTEM

Tommy B. Molinar, Ft. Worth, and Jerome E. Johnston, Austin, both of Tex., assignors to General Electrodynamics Corporation, Arlington, Tex.

Filed Mar. 14, 1988, Ser. No. 167,528

Int. Cl.[5] G01G *21/00, 23/01*

U.S. Cl. 364—567 **3 Claims**

1. A system for measuring weight of a load comprising:

a plurality of load sensing units, each including:

a load cell operable in only one of a plurality of load ranges,

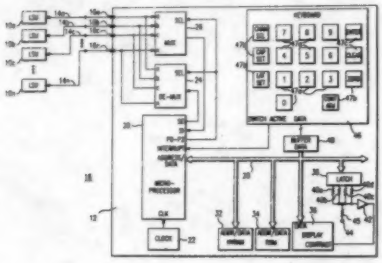
a differential amplifier coupled to said load cell, configured to have a variable gain for calibrating said load sensing unit, and configured so that a full scale common mode input signal to said amplifier is attenuated by said amplifier to an amplitude less than said quantizing uncertainty parameter,

a filter coupled to said amplifier and configured to attenuate full scale signals at 50 Hz and greater to an amplitude which is less than said quantizing uncertainty parameter, and

an analog-to-digital converter coupled to said filter and having said quantizing uncertainty parameter associated therewith, said converter being for supplying a digital load data value; and a controller remotely located from each of said load sensing units, said controller including:

computing means coupled to each of said converters in said plurality of load sensing units,

means for receiving information identifying said one of a plurality of load ranges for each said load sensing units and identifying a latitude at which the load is being measured, and for supplying a load range data value for each



of said load sensing units and a latitude data value to said computing means, and

means for displaying weights calculated by said computing means, and

memory means for storing a program executable by said computing means, said memory means being configured so that when said computing means executes said program, said computing means calculates and displays weight experienced by one of said plurality of load sensing units using one of said digital load data values, one of said load range data values, and said latitude data value.

4,967,385

ELECTRONIC CONTROL SYSTEM FOR POWERSHIFT TRANSMISSION

Kevin L. Brekkestran, and John C. Thomas, both of Fargo, N. Dak., assignors to J.I. Case Company, Racine, Wis.

Division of Ser. No. 55,820, May 29, 1987, Pat. No. 4,855,913. This application Aug. 3, 1989, Ser. No. 389,392

Int. Cl.[5] G01R *17/02;* B60K *41/18*

U.S. Cl. 364—571.03 **17 Claims**

14. In an apparatus having at least one actuator means for adjusting at least one parameter within the apparatus in response to a first electrical signal which is an alternating electrical signal the actuator means including a solenoid coil to which the first electrical signal is applied, a temperature sensing system for determining the approximate operating temperature of the apparatus relative to a predetermined temperature, the system comprising:

means for applying a second electrical signal of known magnitude to the solenoid coil which, at the predetermined temperature, is known to produce a predetermined current level;

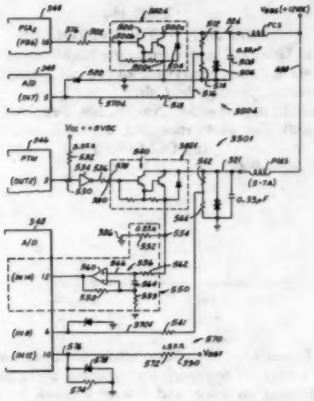
means for sensing the amount of current actually flowing through the coil in response to the second electrical signal; and

means for determining difference between the amount of current sensed and the predetermined current level; and

means for adjusting the first electrical signal in response to the determined difference.

15. A system as in claim 14 wherein the apparatus is a power-transmitting apparatus, the actuator means is a proportional modulation device which enables one operating parameter of the device of the apparatus to be adjusted to substantially any

value within a selected range of values, the first electrical signal is a pulse width modulated signal, and the second signal



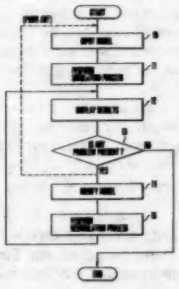
is a direct current signal having a voltage value approximately equal to the nominal full voltage rating of the solenoid coil.

4,967,386

SIMULATION METHOD FOR MODIFIABLE SIMULATION MODEL

Kazuhiko Maeda, Yokohama, and Sadao Shimoyashiro, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,890
Claims priority, application Japan, Apr. 22, 1988, 63-98324
Int. Cl.[5] G06G *7/48*
U.S. Cl. 364—578 **14 Claims**



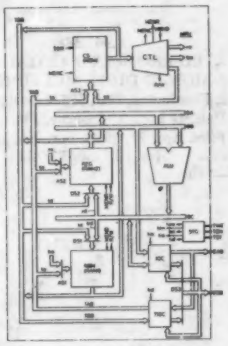
1. A simulation method, comprising the steps of:
storing a modifiable discrete simulation model;
producing discrete future conditions of the model by exercising the model in a simulation process;
detecting transitions of states of the model arising when producing discrete future conditions by exercising the model;
storing said transitions where each transition is an in-simulation instant of time and a transition state; and
after an interruption of the simulation process occurs while said model is in a first state, returning to a second state of the model, which preceded said first state, said step of returning comprising,
reading out a stored transition state immediately preceding said first state,
determining if said second state has been achieved and if it has not been achieved continuing to read out the stored immediately preceding transition states until said second state is achieved.

4,967,387

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Nobuo Shibasaki, Tokyo; Toshio Tanaka, Kanagawa; Yoshiharu Nagayama, Tokyo, and Kenjiro Yasunari, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,605
Claims priority, application Japan, May 27, 1987, 62-128240; Sep. 5, 1987, 62-222843
Int. Cl.[5] G01R *15/12*; G06F *11/32*
U.S. Cl. 364—580 **5 Claims**



1. An integrated circuit microprocessor operable in a test mode and a predetermined operation mode, the integrated circuit microprocessor comprising:
a test mode terminal for receiving a test mode signal, the test mode signal having a first logic level representative of the test mode and a second logic level representative of a predetermined operation mode;
a mode control circuit, operatively associated with the test mode data terminal, for generating a control signal, the control signal having a first state when the test mode signal is in the first logic level to force the integrated circuit microprocessor into the test mode and the control signal having a second state when the test mode signal is in the second logic level to force the integrated circuit microprocessor into the predetermined operation mode;
a plurality of memories, each having an address input and a data output;
address generating circuit means, having output terminals, for generating address signals for the address input of each of the plurality of memories when the integrated circuit microprocessor is in the predetermined operation mode, and a logic operation unit;
a plurality of internal address buses coupled to the output terminals of the address generating circuit;
a test address bus;
selecting means for coupling the plurality of internal address buses to the address input of each of the plurality of memories when the control signal is in the second state and for coupling the test address bus to the address input of each of the plurality of memories when the control signal is in the first state;
data bus means, coupled to the outputs of each of the plurality of memories and to the address generating circuit means, for transferring data from the plurality of memories;
external address terminals for receiving an external address signal;

external data terminals for receiving an external data signal;

address input means for coupling the external address signal received on the external address terminals to the test address bus when the integrated circuit microprocessor is in the test mode;

address output means for coupling the address generating circuit means to the external address terminals when the integrated circuit microprocessor is in the predetermined operation mode; and,

data input/output means for coupling data on the data bus means to the external data terminals and for coupling data on the external data terminals to the data bus means;

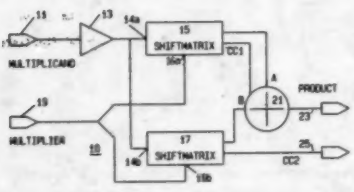
wherein the test mode, respective address spaces of the plurality of memories are arranged in one address space thereby accessing the plurality of memories as one memory from the outside of the microprocessor.

4,967,388

TRUNCATED PRODUCT PARTIAL CANONICAL SIGNED DIGIT MULTIPLIER

Larry R. Tate, Flemington, N.J. 08822, assignor to Harris Semiconductor Patents Inc., Melbourne, Fla.

Filed Apr. 21, 1988, Ser. No. 178,982
Int. Cl.[5] G06F 7/52
U.S. Cl. 364—760 **10 Claims**



1. A multiplier circuit comprising:

a first shift matrix having a data signal input for receiving an N-bit two's complement multiplicand signal which is to be weighted, a control signal input for receiving a first signed multiplier signal, and a first partial product output for providing a one's complement form of said N-bit two's complement multiplicand signal shifted by a first predetermined number of bit positions determined by the value of said first multiplier, said partial product being truncated to a number of bits less than 2N—1;

a second shift matrix having a data signal input for receiving said N-bit two's complement multiplicand signal which is to be weighted, a control signal input for receiving a second signed multiplier signal, and a second partial product output for providing a one's complement form of said N-bit two's complement multiplicand signal shifted by a second predetermined number of bit positions determined by the value of said second multiplier signal, said second partial product output being truncated to a number of bits which is less than 2N—1;

each of said shift matrices including logic means for evaluating the bits truncated from each of said partial product outputs as a function of the magnitude and sign of associated multiplier bits to provide first and second carry signal outputs suited for forming two's complement forms of said truncated partial products; and

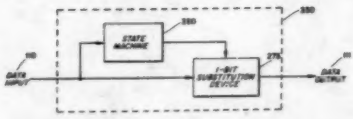
a first adder having a first addend input coupled to said truncated one's complement partial product output of said first shift matrix, a second addend input coupled to said truncated one's complement partial product output of said second shift matrix, a carry input coupled to said first carry signal output so as to produce the two's complement of said first partial product and an output at which a weighted product signal is provided which when combined with said second carry signal output comprises a two's complement product signal; where N is greater than 2.

4,967,389

BIT DENSITY CONTROLLER

Jimmy K. Omura, Cuppertino; Leslie Nightingill, Palo Alto, and Michael J. Sabin, Sunnyvale, all of Calif., assignors to Cylink Corporation, Sunnyvale, Calif.

Continuation-in-part of Ser. No. 946,808, Dec. 29, 1986, Pat. No. 4,771,400. This application Oct. 22, 1987, Ser. No. 111,181
Int. Cl.[5] G06F 1/00
U.S. Cl. 364—900 **20 Claims**



1. A bit density controller encoder for continuously operating on a data bit sequence for ensuring there are at least m 1-bits present in each and every window of am+b bits, wherein a and b are specified integers, and having a data input and a data output, comprising:

state means having n states wherein a total number of states, n, equals a sum of the specified integers a and b, a state index and states zero through n—1, and coupled to the data input, for sensing the data bit sequence and incrementing said state index to a next higher state in response to sensing a 0-bit, returning said state index to a zero state in response to sensing a 1-bit with said state index at any of states zero through a—1, decrementing said state index by a—1 states in response to sensing a 1-bit with said state index at any of states a through n—1, and generating an output signal in response to incrementing said state index past the n—1 state;

substitution means coupled to the data input and said state means, and responsive to the output signal, for changing the 0-bit following n—1 state to a 1-bit;

buffer means coupled to said substituting means for storing at least one frame of said data bit sequence;

memory means coupled to said state means and responsive to the output signal, for generating and storing overhead bits; and

means coupled to said memory means, said buffer means, and said data output, for inserting said overhead bits into said data bit sequence and outputting said data bit sequence to said data output.

4,967,390

BUS DRIVING AND DECODING CIRCUIT

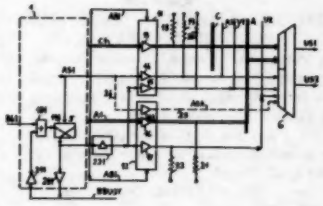
Francesco Rendina, Nova Milanese, and Lucio Savogin, Como, both of Italy, assignors to Bull HN Information Systems Italia S.p.A., Caluco, Italy

Filed Aug. 10, 1988, Ser. No. 230,636
Claims priority, application Italy, Sep. 16, 1987, 21919 A87
Int. Cl.[5] G06F 3/00
U.S. Cl. 364—900 **4 Claims**

1. A bus driving and decoding circuit for putting on a bus of a data processing system a set of binary signals and for decoding said set of signals put on said bus, at least one said set of signals including validated signal which has a minimum propagation delay, comprising a plurality of driver elements coupled to said bus, each said driver element having a signal output coupled to said bus for inputting one of said binary signals on said bus, and a decoder coupled to said bus and having inputs connected to said bus for receiving said set of signals, said plurality of drivers comprising at least two sets, each set being implemented in a single integrated component, each integrated component having a control input for enabling the transfer at the output of the drivers in said set of signals input to said

driver set, with a propagation delay intrinsically equal in all drivers of said driver set and a minimum spread from driver to driver of said driver set, characterized in that said circuit comprises:

first means for jointly applying an enabling signal (ABI) to said control input of said integrated components and to the input of a first driver in each set, to obtain as output from said first driver in each set a validation signal



(V1,V2) which is input to said decoder, said validation signal having a delay intrinsically equal to the propagation delay of the related set, and

delay means upstream or downstream from said first driver of each set to provide each of said validation signals to said decoder with an incremental delay sufficing to overlap the propagation delay spread of the related driver set, said decoder being enabled by the joint assertion of said validation signals.

4,967,391

DATA STRING RETRIEVAL APPARATUS FOR IC CARD

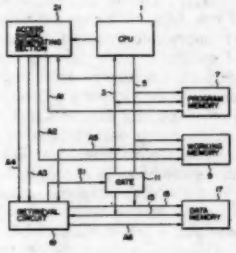
Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 16, 1989, Ser. No. 324,445

Claims priority, application Japan, Mar. 18, 1988, 63-63464; Mar. 18, 1988, 63-63473

Int. Cl.[5] G06F *1/00*

U.S. Cl. 364—900 **6 Claims**



1. A data string retrieval apparatus, comprising:

storage means for storing a plurality of data strings;

control means for generating predetermined retrieval data to perform accessing of said storage means;

retrieval means for retrieving a data string to be retrieved on the basis of the retrieval data from said control means;

first access bus means connected to said control means;

second access bus means for connecting said storage means and said retrieval means; and

gate means, connected between said first and second access bus means, for supplying the retrieval data from the control means to the second access bus means through said first access bus means, except during an operation of said retrieval means, whereby said control means is isolated from said storage means and said retrieval means while said retrieval means retrieves a data string from the storage means.

4,967,392

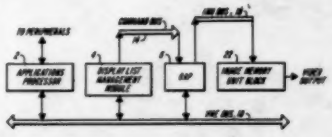
DRAWING PROCESSOR FOR COMPUTER GRAPHIC SYSTEM USING A PLURALITY OF PARALLEL PROCESSORS WHICH EACH HANDLE A GROUP OF DISPLAY SCREEN SCANLINES

Ross G. Werner, Woodside, Calif., and Eric L. Ryherd, Brookline, N.H., assignors to Alliant Computer Systems Corporation, Littleton, Mass.

Filed Jul. 27, 1988, Ser. No. 225,113

Int. Cl.[5] G06F *3/153*

U.S. Cl. 364—900 **21 Claims**



1. In an apparatus for generating and storing pixel representations for the display of graphic data in a two-dimensional pixel plane defined by a plurality of contiguous, parallel display scanlines, each of which includes a plurality of contiguous pixels, having

means for providing instructions in the form of a first sequence of commands which define representations of said graphic data in a coordinate plane;

an image memory unit block for receiving said commands and for controlling a random access image memory into which pixel display data is written, wherein the scanlines are associated into N sets, where N is at least one, said image memory unit block having at least one image memory unit, the invention comprising each said image memory unit having a serial and parallel data processing architecture comprising:

a. N first data processing means configured for parallel processing, each data processing means generating pixel data for pixels associated with those scanlines included in one only of said N sets of scanlines;

b. a second data processing means in a series configuration with the first data processing means and including:

i. means for receiving commands of the first sequence; and

ii. a controller:

(1) for generating commands of a second sequence identifying parameters relating to locations on said pixel plane corresponding to located shapes defined by said first sequence of commands;

(2) for passing to said first data processors of the image unit said parameters relating to pixel plane locations; and

(3) for passing to said first processors of the image unit commands of the second sequence, relating to color characteristics of said located shapes; and

c. each said N first data processors of an image memory unit comprising:

i. means for receiving as inputs the location parameter commands of the second sequence and means for generating pixel locations as outputs;

ii. means for generating memory addresses corresponding to selected pixel locations;

iii. means for receiving as inputs commands of the second sequence relating to color characteristics of said located shapes and generating pixel data as outputs; and

iv. means for writing the pixel data to the random access image memory at memory addresses generated by said address generator; and

wherein each of the N first data processors writes to memory pixel data only with respect to pixels on a scanline in the set associated with each said first data processor.

4,967,393

FLASH ERASABLE AND PROGRAMMABLE NONVOLATILE SEMICONDUCTOR MEMORY

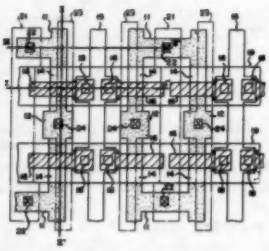
Sadayuki Yokoyama, Kawasaki, and Kaoru Nakagawa, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 154,065, Feb. 9, 1988, abandoned. This application Jan. 3, 1990, Ser. No. 462,346

Claims priority, application Japan, Feb. 20, 1987, 62-37072

Int. Cl.[5] G11C *11/34*

U.S. Cl. 365—185 **15 Claims**



1. A nonvolatile semiconductor memory comprising:

a semiconductor region of a first conductivity type; and

a plurality of memory cell groups, each having four memory cells, including:

a shared source conductive layer of a second conductivity type formed on said semiconductor region and connected to a first potential,

first, second, third and fourth drain conductive layers, of the second conductivity type, formed on said semiconductor region around said shared source conductive layer at equal distances from a center portion thereof, said first and second drain conductive layers being positioned in a first direction from said shared source conductive layer, said third and fourth drain conductive layers being positioned in a second direction, opposite to said first direction, from said shared source conductive layer, and regions between said shared source conductive layer and said first, second, third and fourth drain conductive layers constituting first, second third and fourth channel regions, respectively;

first and second control gate conductive layers, extending in a third direction substantially perpendicular to said first direction, formed above said semiconductor region such that said first control gate conductive layer covers said first and second channel regions and said second control gate conductive layer covers said third and fourth channel regions, with an insulating film being sandwiched between said first and second control gate conductive layers and their respective channel regions;

first, second third and fourth floating gate conductive layers respectively formed above said first, second, third and fourth channel regions in said insulating film,

first, second, third and fourth erase gate electrodes respectively formed in said insulating film such that portions of said first, second, third and fourth erase gate electrodes respectively overlap portions of said first, second, third and fourth floating gate conductive layers.

first and second erase gate lines extending parallel to each other, said first erase gate line being provided on one side of said four memory cells and said second erase gate line being provided on an opposite side of said four memory cells, each of said first and second erase gate lines being formed integrally with two of said first, second, third and fourth erase gate electrodes such that said first and second erase gate lines do not overlap said shared source conductive layer; and

a first data line connected to said first and second drain conductive layers and a second data line connected to said third and fourth drain conductive layers.

4,967,394

SEMICONDUCTOR MEMORY DEVICE HAVING A TEST CELL ARRAY

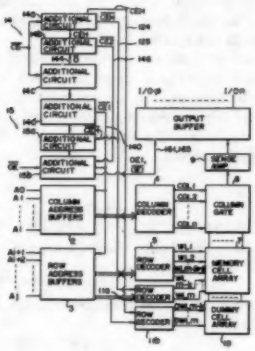
Hidenobu Minagawa, Kawasaki; Yuuichi Tatsumi, Tokyo; Hiroshi Iwahashi, Yokohama; Masamichi Asano, Tokyo, and Mizuho Imai, Annaka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 8, 1988, Ser. No. 241,748

Claims priority, application Japan, Sep. 9, 1987, 62-225529; Dec. 3, 1987, 62-306165

Int. Cl.[5] G11C *7/00, 29/00*

U.S. Cl. 365—201 **31 Claims**



25. A semiconductor memory device comprising:

a memory cell array including nonvolatile memory cells;

a plurality of row lines, each row line being connected to respective memory cells arranged thereon;

a plurality of column lines, each column line being connected to respective memory cells arranged thereon;

address buffer means for receiving address signals and providing respective internal address signals;

means for selecting one of said plurality of row lines other than at least one predetermined row line and means for selecting one of said plurality of column lines to designate one of the memory cells in response to the address signals provided from the address buffer means;

means for providing a test mode signal in response to an input control signal provided to the input of said test mode signal providing means; and

means for selecting said at least one predetermined row line in accordance with the internal address signals provided from the address buffer means and the test mode signals provided from said test mode signal providing means,

wherein said test mode signal providing means includes a high voltage detection circuit which produces said test mode signal having a normal logic level whenever said input control signal has a predetermined high level higher than the normal logic level and means for providing a normal mode signal having logic levels different from those of the test mode signal whenever the input control signal has the normal logic level,

wherein said test mode signal providing means includes means for converting said input control signal into a chip control signal having the predetermined high level when-

ever the input control signal has the predetermined high level and converting said normal mode signal into a chip control signal having the normal logic level and being in phase with the input control signal whenever the input control signal has the normal logic level, and

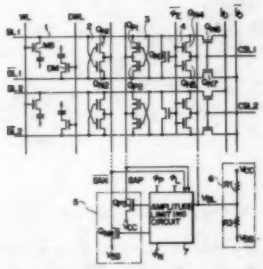
wherein said test mode signal providing means includes a NAND gate circuit whereby the input control signal and the test mode signal are provided thereto and means for inventing the output of the NAND gate circuit to provide a chip enable signal.

4,967,395

DRAM WITH (½)VCC PRECHARGE AND SELECTIVELY OPERABLE LIMITING CIRCUIT

Yohji Watanabe, Kawasaki, and Tohru Furuyama, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 31, 1989, Ser. No. 304,173
Claims priority, application Japan, Mar. 15, 1988, 63-61384
Int. Cl.[5] G11C *11/34*
U.S. Cl. 365—203 **7 Claims**



1. A DRAM comprising:

a memory array including a plurality of dynamic memory cells each consisting of one MOS transistor and one capacitor, a plurality of pairs of bit lines, arranged along a direction of a matrix of said memory cells, for exchanging information charges with said memory cells, and a plurality of word lines, intersecting said bit lines, for selecting said memory cells;

a bit line precharge circuit including a precharge voltage generator for precharging each pair of bit lines to a (½) power-supply voltage;

a plurality of bit line sense amplifiers, enabled in an active cycle, for detecting a potential difference between each of said pair of bit lines; and

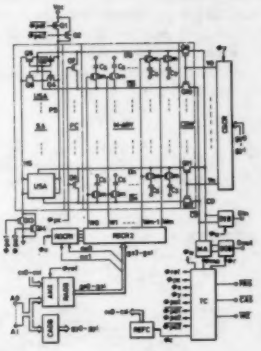
an amplitude limiting circuit for limiting a potential amplitude variation between the precharge voltage and an "H" level output of each of said pair of bit lines charged and discharged by each of said plurality of bit line sense amplifiers and for limiting a potential amplitude variation between the precharge voltage and an "L" level output of each of said pair of bit lines, so that an absolute value of each of the respective potential amplitude variations are equal to each other and are also equal to a voltage value less than an absolute value of the (½) power-supply voltage.

4,967,396

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Kazuhiko Kajigaya, and Osamu Tsuchiya, both of Ohme, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 173,097, Mar. 28, 1988, abandoned.
This application Jan. 29, 1990, Ser. No. 471,073
Claims priority, application Japan, Mar. 27, 1987, 62-71429
Int. Cl.[5] G11C *11/40, 13/00*
U.S. Cl. 365—207 **22 Claims**



1. A semiconductor integrated circuit device comprising:

(a) a plurality of blocks arranged in columns on a semiconductor substrate;

(b) a plurality of first and second word lines disposed in rows and extending in columns, wherein said first and second word lines are divided at every block;

(c) a plurality of first semiconductor regions formed at the surface of said semiconductor substrate and positioned between said first and second word lines;

(d) a plurality of second semiconductor regions formed at the surface of said semiconductor substrate and positioned at outside edges of said first and second word lines, wherein said first semiconductor regions, said second semiconductor regions and said first and second word lines form a plurality of first and second MOSFETs, wherein each of said first MOSFETs shares one of said first semiconductor regions with one of said second MOSFETs;

(e) a plurality of capacitor elements each connected to said second semiconductor regions so as to connect said each of said capacitor elements to said first and second MOSFETs in series;

(f) a plurality of first conductive layers connected to said first semiconductor regions and overlapping said first and second word lines;

(g) a plurality of data lines connected to said first conductive layers and extending in rows; and

(h) a plurality of further word lines formed in rows and extending in columns over said plurality of blocks, wherein one of said first word lines in one of said blocks and one of said second word lines in an adjacent block to said one of said blocks are connected to one of said plurality of further word lines.

4,967,397

DYNAMIC RAM CONTROLLER

Jeffrey A. Walck, Lebanon, N.J., assignor to Unisys Corporation, Blue Bell, Pa.

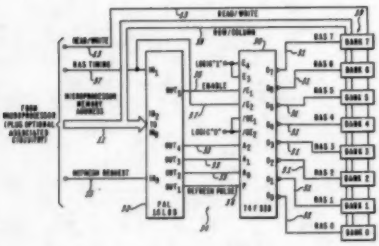
Filed May 15, 1989, Ser. No. 351,883
Int. Cl.[5] G11C *7/00, 8/00*; G06F *9/00*
U.S. Cl. 365—222 **16 Claims**

1. DRAM controller apparatus for use with a DRAM array having a plurality of banks, each said bank having a coordinate

address strobe input, said controller being responsive to a memory address signal for selecting one of said banks, said memory being operative in a memory access cycle wherein one of said banks is selected by selectively actuating said coordinate address strobe input thereof and a refresh cycle for refreshing said DRAM array in response to a refresh request signal by simultaneously actuating said coordinate address strobe inputs of all said banks, comprising

first circuit means including encoding means responsive to said memory address signal for providing an encoded digital coordinate address strobe signal representative of said selected bank and having a number of bits smaller than the number of said banks,

second circuit means including decoding means and polarity inverting means, and



bus means for coupling said encoded digital coordinate address strobe signal from said first circuit means to said second circuit means,

said decoding means comprising means having a plurality of outputs coupled respectively to said coordinate address strobe inputs of said banks and responsive to said encoded digital coordinate address strobe signal for selectively energizing one of said outputs in accordance therewith, thereby selecting said bank corresponding to said encoded digital coordinate address strobe signal,

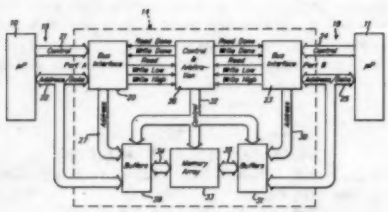
said polarity inverting means comprising means responsive to said refresh request signal for simultaneously inverting the polarity of all of said outputs, thereby effecting said refresh cycle.

4,967,398

READ/WRITE RANDOM ACCESS MEMORY WITH DATA PREFETCH

Saad A. Jamoua, Oak Park, and Stephen W. Hoffman, Riverview, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 9, 1989, Ser. No. 390,952
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—230.05 **10 Claims**



1. A method for communicating data between a read/write memory and an electronic processor over a multiplexed information path, said method comprising the steps of:

transmitting a valid address on said information path from said processor to said memory;

transmitting a signal from said processor to said memory indicating that the information transmitted on said information path is a valid address;

latching said valid address in said memory in response to said signal indicating a valid address;

retrieving the contents at said valid address in response to said signal and without any indication whether data is to be transferred to or from said memory;

storing said contents in a register;

transmitting either a write request or a read request from said processor to said memory; and

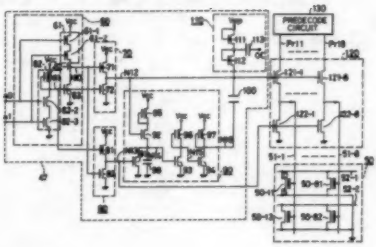
transferring said contents from said register to said information path in response to said read request.

4,967,399

ERASABLE AND PROGRAMMABLE READ-ONLY MEMORY SYSTEM

Hiroshi Kuwabara, and Shooji Kitazawa, both of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd, Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,375
Claims priority, application Japan, Aug. 3, 1987, 62-194258
Int. Cl.[5] G11C *8/00*
U.S. Cl. 365—230.06 **8 Claims**



1. An erasable and programmable read-only memory system, comprising:

(a) a memory cell block including a plurality of memory cells arranged in a matrix comprising at least first and second groups, each of said memory cells having a first electrode, a second electrode and a control gate, the first electrodes of the memory cells of each of said groups being connected to form a bit line for that group, the second electrodes of the memory cells of said first and second groups being connected to a common reference potential, and the control gate of each of said memory cells of said first group being connected to a corresponding control gate of a memory cell of said second group to form a plurality of word lines, a predetermined writing potential being applied to the control gate of each semiconductor device for writing therein;

(b) a logic circuit for generating a selection signal and an inversion thereof in response to a first internal address signal, said logic circuit comprising

input terminal means for receiving said first internal address signal;

aa first output terminal for outputting said selection signal; and

a second output terminal for outputting an inversion signal inverse to said selection signal;

(c) a delay circuit for delaying said selection signal comprising;

an input terminal connected to said first output terminal of said logic circuit;

a control terminal connected to the second output terminal of said logic circuit for receiving said inversion signal; and

an output terminal for outputting a delayed signal obtained by delaying said selection signal, said delay circuit being controlled by the inversion signal to produce said delayed signal;

(d) a boosting capacitor having a first terminal connected to the first output terminal of said logic circuit and a second terminal connected to the output terminal of said delay circuit;

(e) a voltlage boosting circuit connected to the first terminal of said boosting capacitor for raising the potential on the first terminal thereof above said writing potential for said memory cells;

(f) a predecode circuit for selectively supplying a plurality of predecode signals at said writing potential in response to a second internal address signal at the time of writing, said predecode circuit having a plurality of output terminals for outputting said predecode signals; and

(d) a selector circuit for applying selected predecode signals to said word lines, said selector circuit comprising:

a first group of transistors, each having a first electrode connected to the corresponding one of the output terminals of said predecode circuit, a second electrode connected to a corresponding one of said word lines, and a gate connected to the first terminal of said boosting capacitor; and

a second group of transistors corresponding to the first group of transistors, each having a first electrode connected to the corresponding one of said word lines, a second electrode connected to said reference potential, and a gate connected to the second output terminal of said logic circuit.

4,967,400

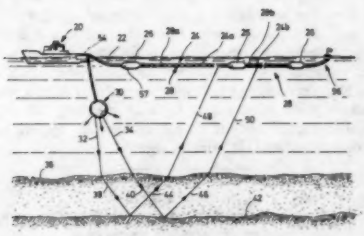
DIGITAL MARINE SEISMIC SYSTEM

Theodore E. Woods, Stafford, Tex., assignor to Syntron, Inc., Houston, Tex.

Continuation of Ser. No. 160,613, Feb. 26, 1988, abandoned, which is a continuation of Ser. No. 869,429, Jun. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 621,495, Jun. 18, 1984, abandoned. This application Oct. 16, 1989, Ser. No. 423,536

Int. Cl.[5] G01V *1/22*

U.S. Cl. 367—21 **14 Claims**



1. A digital marine seismic system adapted to be towed behind a ship for collecting sound waves representative of seismic signals, for generating digital data signals representative of the seismic signals, and for telemetering the digital data signals to shipboard control electronics, the shipboard control electronics being of the type which generates control signals for controlling the collecting, the generating, and the telemetering of the data, comprising:

(a) a seismic cable, including a data transmission system, adapted for being towed behind the ship, the transmission system including first and second transmission links defining a system wherein every control signal transmitted from the ship on the first transmission link returns unchanged on the second transmission link;

(b) a plurality of data acquisition control modules physically spaced along said cable at various distances from said shipboard control electronics, each said module being in communication with the shipboard control electronics via said first and second transmission links, and each module having means for receiving a plurality of analog seismic data signals and generating said digital data signals; and

(c) a plurality of seismic sensors secured to said cable and adapted for generating said plurality of analog seismic data signals in response to the receipt of the sound waves.

4,967,401

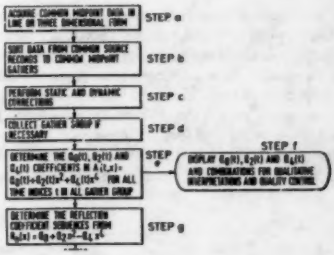
METHOD OF ACQUIRING AND INTERPRETING SEISMIC DATA TO OBTAIN LITHOLOGICAL PARAMETERS

William M. Barney, Englewood, Colo., assignor to Seislith Development, Inc., Denver, Colo.

Continuation of Ser. No. 777,939, Sep. 19, 1985, abandoned. This application Jul. 24, 1989, Ser. No. 384,510

Int. Cl.[5] G01V *1/28*

U.S. Cl. 367—46 **8 Claims**



1. A method to determine lithology or fluid or gas content of strata, comprising the steps of:

(a) positioning and employing a plurality of seismic wave source-detector pairs having different offsets and one common horizontal midpoint;

(b) generating seismic waves with said sources, and detecting and recording the amplitudes of seismic waves reflected by discontinuities in the lithological parameters of said strata, for each source-detector pair;

(c) relating said different offsets to variations in said amplitudes using mathematical equations containing at least one lithological parameter of two or more adjacent strata and said amplitudes and offsets;

(d) deconvolving the amplitudes into reflection coefficient spikes for said strata;

(e) determining the value of any of the lithological parameters of one or more strata successively through said mathematical equations by knowledge of the value of lithological parameters of an adjacent strata; and

(f) predicting the composition of the strata for which the value of a lithological parameter has been determined by comparison of said value with known values for known compositions.

4,967,402

SEALED WATCHCASE

Georges Claude, 107bis, rue Ju Parc, Ch-2301 La Chaux-de-Fonds, Switzerland

Filed Feb. 7, 1989, Ser. No. 307,838

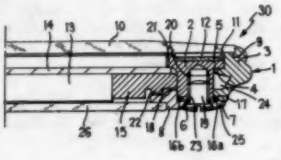
Claims priority, application Switzerland, Feb. 8, 1988, 437/88

Int. Cl.[5] G04B *37/00*

U.S. Cl. 368—280 **12 Claims**

1. A sealed watchcase, comprising: an annular middle-bezel part which includes an annular outer part and includes an annular inner part disposed concentrically within said outer part in frictional engagement therewith, said inner part being

made of a rigid material and said outer part being made of a precious metal; a first cover which has a central portion made of a transparent material and which has a peripheral edge portion bonded to said outer part; a second cover and means for releasably securing said second cover to said inner part; an annular seal compressed between said second cover and one of said inner and outer parts; a movement; and a fitting ring disposed within said inner part and fixedly positioning said movement within said inner part, said inner part being free of



contact with said movement; wherein said inner part has a substantially cylindrical and radially outwardly facing surface portion adjacent said second cover, and wherein said outer part has an annular skew surface which, from a location adjacent said cylindrical surface on said inner part and spaced from said second cover part, extends radially outwardly from said inner part and toward said second cover part, said annular seal being disposed between said skew surface on said outer part and said cylindrical surface portion on said inner part.

4,967,403

MULTI-FORMAT OPTICAL DISK AND READING DEVICE

Hiroshi Ogawa, Kanagawa, and Yoichiro Sako, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

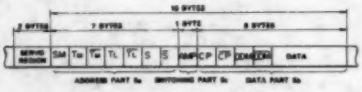
PCT No. PCT/JP87/00557, § 371 Date Apr. 20, 1988, § 102(e) Date Apr. 20, 1988, PCT Pub. No. WO88/01785, PCT Pub. Date Mar. 10, 1988

PCT Filed Jul. 29, 1987, Ser. No. 196,013

Claims priority, application Japan, Aug. 25, 1986, 61-198530; Aug. 25, 1986, 61-198531; Sep. 30, 1986, 61-232512

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.26 **6 Claims**



4. A disk-shaped recording medium for use in an apparatus for reading said medium, comprising a disk having tracks containing alternating servo signal regions and data address signal regions formed circumferentially around said disk, wherein said servo signal regions contain pits for tracking recorded at alternately offset positions with respect to the center of the track and pits for clock generation recorded at the center position of the track, as servo signals, and said data address signal regions contain at least data signals and address signals written in either a first or second signal format, and wherein signals recorded in said first format and signals recorded in said second format are separated by either a recording area sufficient to allow said apparatus for reading said disk to switch between the signals recorded in said first format and the signals recorded in said second format or one of said servo signal regions.

4,967,404

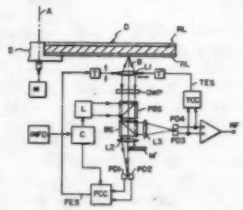
FOCUS/TRACKING SERVO AUTOMATIC GAIN CONTROL FOR OPTICAL RECORDING

David M. Orlicki, Rochester, and William T. Fearnside, Fishers, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 279,678

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.11 **4 Claims**



1. In a recording system in which a focused beam of radiation is used to write and/or read information on a moving recording element, said recording system including a focus and/or tracking-control servo system for maintaining said beam in sharp focus on a desired portion of the recording element, said servo system comprising: (a) a pair of photodetectors positioned to be irradiated by the beam of radiation upon being reflected or transmitted by the recording element, each of said photodetectors being adapted to produce an electrical signal proportional to the intensity of irradiation received thereby, and (b) differential circuit means operatively coupled to said photodetectors for producing an error signal representing the focus and/or tracking condition of the radiation beam on the recording element, the improvement comprising:

automatic gain control circuitry for providing said servo system with a substantially constant gain that is substantially independent of variations in the intensity of irradiation received by said photodetectors, said automatic gain control circuitry comprising a summing circuit operatively coupled to the respective outputs of said photodetectors for producing a control signal representing the sum of said photodetector output signals, and a variable attenuator circuit operatively coupled to said photodetector outputs and responsive to said control signal for equally attenuating the respective outputs of said photodetectors prior to summing by said summing circuit, each photodetector output being attenuated by an amount proportional to said control signal.

4,967,405

SYSTEM FOR CROSS-CONNECTING HIGH SPEED DIGITAL SONET SIGNALS

Daniel C. Upp, Southbury, and William T. Cochran, Milford, both of Conn., assignors to TranSwitch Corporation, Shelton, Conn.

Filed Dec. 9, 1988, Ser. No. 283,172

Int. Cl.[5] H04J *14/00*

U.S. Cl. 370—1 **38 Claims**

1. A modular, expandable, cross-connect system for high speed SONET digital signals, comprising:

(a) receiving means for receiving at least one signal formatted in a substantially SONET format;

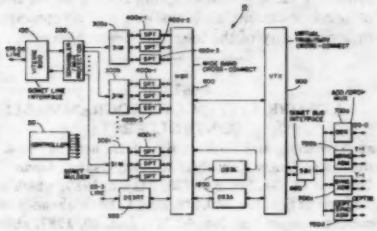
(b) transmitting means for transmitting at least one cross-connected substantially SONET formatted signal; and

(c) cross-connection means coupled to said receiving means and said transmitting means for cross-connecting said substantially SONET formatted signal from said receiving means to said transmitting means, wherein

said cross-connection means comprises at least a virtual

tributary cross-connection means, said virtual tributary cross-connection means comprising;

SONET signal receiving means for receiving a plurality of substantially SONET formatted signals, including means for disassembling said substantially SONET



formatted signals into virtual tributary payloads of tracked phase, and

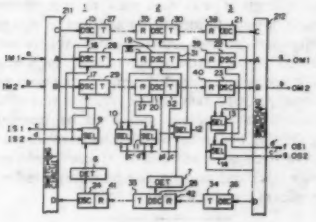
means for cross-connecting said virtual tributary payloads in space, time, and SONET phase to generate a new substantially SONET formatted signals.

4,967,406

SUBSIGNAL TRANSMITTING SYSTEM

Takeshi Yagi, and Toshio Tamura, both of Otawara, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 14, 1989, Ser. No. 407,943
Claims priority, application Japan, Sep. 14, 1988, 63-230733
Int. Cl.[5] H04J *3/02*
U.S. Cl. 370—16 **12 Claims**



1. A subsignal transmitting system having a plurality of working lines for respectively transmitting corresponding ones of a plurality of multiplexed signals, each including a main signal, and having at least one protection line for transmitting an associated one of said plurality of multiplexed signals when it is detected that the transmitting conditions of one of said working lines along which an associated one of said multiplexed signals is being transmitted are deteriorated, each of the working protection liens having respective input sides and output sides and wherein each of said plurality of multiplexed signals includes a subsignal multiplexed with a corresponding said main signal, said subsignal transmitting system comprising:

a plurality of subsignal input terminals for respectively receiving input subsignals;

a plurality of subsignal output terminals for respectively outputting corresponding subsignals, vafiously as transmitted through associated ones of said plurality of working lines or a respectively associated said protection line;

a switching signal transmission line for transmitting, in the direction opposite to the direction of transmission of said multiplexed signals, a switching signal indicating which one of said working lines is too deteriorated for transmission of the corresponding multiplexed signal;

transmitting side subsignal switching means operatively connected to said subsignal input terminals, for outputting a selected one of said input subsignals to a respectively associated said protection line in response to said switching signal for insertion of the selected input subsignal into the main signal transmitted in said protection line, and for outputting the remaining subsignals respectively corresponding to said working lines so as to be inserted into the main signals in said respectively corresponding lines;

receiving side subsignal switching means, operatively connected to said subsignal output terminals and responsive to said switching signal, for outputting said subsignal received through said respectively associated protection line to the corresponding one of said subsignal output terminals, the remaining subsignals, a are transmitted through said working lines, being output to the remaining output terminals, respectively;

transmitting side main signal switching means having a plurality of main signal input terminals and a plurality of output terminals operatively connected to the input sides of said plurality of working lines and said respectively associated protection line, for connecting said main signal input terminals to the input sides of said working lines respectively and for selectively connecting, in response to said switching signal, the corresponding one of said main signals to the input side of said selected protection line; and

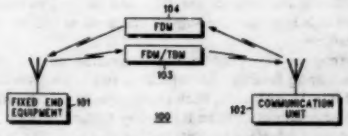
receiving side main signal switching means having a plurality of main signal output terminals, for connecting, in response to said switching signal, the output sides of said working lines, except for the said too deteriorated working line, to the corresponding main signal output terminals and for selectively connecting, in response to said switching signal, the output side of said selected protection line to the corresponding main signal output terminal.

4,967,407

CONTINUOUS TRANSMISSION MODE RADIO WITH CONTROL INFORMATION MONITORING CAPABILITY

Charles N. Lynk, Bedford, and Joseph P. Heck, Fort Worth, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 23, 1989, Ser. No. 300,518
Int. Cl.[5] H04J *4/00*
U.S. Cl. 370—50 **2 Claims**



1. In an RF communication system having at least a first station and a second station, wherein the first station transmits information, including both message information and system control information, to the second station in a TDM format, and wherein the second station transmits information to the first station in a non-TDM format, a method of allowing the second station to monitor system control information transmitted by the first station, comprising the steps of:

(a) when in a receive mode, receiving the system control information;

(b) when in a transmit mode:

(i) interrupting a transmission to the first station from time to time; and

(ii) receiving the system control information as transmitted by the first station.

4,967,408

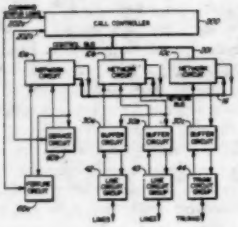
TELEPHONE EXCHANGE INCLUDING SERVICE FEATURE APPARATUS

Khue V. Phan, Milpitas, Calif., assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 30, 1989, Ser. No. 330,475

Int. Cl.[5] H04Q *11/04*

U.S. Cl. 370—62 **6 Claims**



1. A telephone switching facility, for providing communications paths between telephone lines and trunks via a plurality of respective line and trunk interface circuits, for translating information signals between signal operating formats of the lines and trunks and a PCM operating signal format of the telephone switching facility, comprising:

a group of interface circuits within said plurality of interface circuits;

a call controller for directing operations of the switching facility;

a plurality of network paths being operable in a TDM format of repetitive frames of channels for transmission of information signals;

a feature apparatus for providing a telephony feature service via a plurality of channels of up to a first predetermined limit, concurrently;

a network circuit for coupling information signals destined for any of the feature apparatus and an interface circuit within the group of interface circuits, from any of the channels of any of the network paths, provided that no two of said channels are concurrent; and for transmitting information signals from the feature apparatus via exclusively prededicated channels corresponding in number to the first predetermined limit; and for transmitting information signals from any of up to a second predetermined limit of interface circuits in the group of interface circuits, wherein the sum of the first and second predetermined limits is less than the sum of channels in one of the TDM frames;

whereby in an event, during operation of the telephone switching facility, that blocking occurs within the group of interface circuits, such blocking is of no consequence as to accessability of the telephony feature service.

a group of interface circuits within said plurality of interface circuits;

a call controller for directing operations of the switching facility;

a plurality of network paths being operable in a TDM format of repetitive frames of channels for transmission of information signals;

a feature apparatus for providing a telephony feature service via a plurality of channels of up to a first predetermined limit, concurrently;

a network circuit for coupling information signals destined for any of the feature apparatus and an interface circuit within the group of interface circuits, from any of the channels of any of the network paths, provided that no two of said channels are concurrent; and for transmitting information signals from the feature apparatus via exclusively prededicated channels corresponding in number to the first predetermined limit; and for transmitting information signals from any of up to a second predetermined limit of interface circuits in the group of interface circuits, wherein the sum of the first and second predetermined limits is less than the sum of channels in one of the TDM frames;

whereby in an event, during operation of the telephone switching facility, that blocking occurs within the group of interface circuits, such blocking is of no consequence as to accessability of the telephone feature service.

4,967,409

NETWORK SYSTEM OF PROGRAMMABLE CONTROLLERS

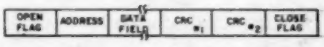
Masao Narumiya, and Toshimi Kiyohara, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 346,723, May 3, 1989, which is a continuation of Ser. No. 240,428, Sep. 1, 1988, abandoned, which is a continuation of Ser. No. 40,747, Apr. 20, 1987, abandoned, which is a continuation of Ser. No. 730,298, May 3, 1985, abandoned. This application Sep. 7, 1989, Ser. No. 404,112

Claims priority, application Japan, May 11, 1984, 59-95438; May 11, 1984, 59-95439; May 11, 1984, 59-95440; May 30, 1984, 59-11743; Jun. 4, 1984, 59-11307

Int. Cl.[5] H04J *3/02, 3/24*

U.S. Cl. 370—085.600 **5 Claims**



1. In a data transmission system comprising mutually connected stations, each of said stations being adapted to receive arriving data packets and to transmit said data packets normally in the order in which said data packets are received, the improvement wherein each of said stations includes means for distinguishing high-priority data packets from normal-priority packets, each of said stations being adapted to separately store high-priority and normal-priority data packets which have been received and to attach one of said high-priority data packets, if there is one stored therein, to the next-to-be-transmitted normal-priority data packet which is one of said stored normal-priority data packets and is to be transmitted next according to the order in which said normal-priority data packets have been received and to transmit said one of said high-priority data and said next-to-be-transmitted normal-priority data packet simultaneously.

4,967,410

METHOD OF MULTIPLEXING DIGITAL SIGNALS AND APPARATUS THEREFOR

Akihiko Takase, Tokyo, and Yoshitaka Takasaki, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 324,656

Claims priority, application Japan, Mar. 18, 1988, 63-63244

Int. Cl.[5] H04J *3/06*

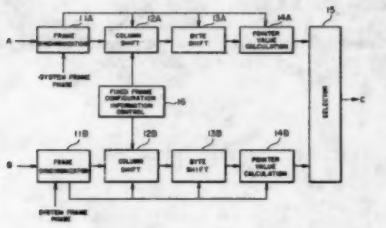
U.S. Cl. 370—105.1 **13 Claims**

1. A digital signal multiplexing method wherein a plurality of transmission frames of a first transmission rate are provided, each transmission frame being multiplexed therein with signals of a second transmission rate in a predetermined interleave segment manner, said first transmission rate being substantially greater than said second transmission rate, and wherein said signals of said second transmission rate are selectively derived from said plurality of transmission frames of said first transmission rate and multiplexed into a transmission frame of said first transmission rate different from said plurality of transmission frames, comprising the steps of:

detecting a collision or conflict of the relative phase between said signals of said second transmission rate selectively derived from said plurality of transmission frames;

in response to detection of said phase collision, providing a predetermined delay to all the predefined segments of at

least one of said selectively derived signals of said second transmission rate to generate a first signal representative



of a non-delayed segment stream and a second signal representative of a delayed segment stream; and multiplexing said first and second segment streams.

4,967,411

METHOD AND APPARATUS FOR FRAME-BIT MODULATION AND DEMODULATION OF DS3 SIGNAL

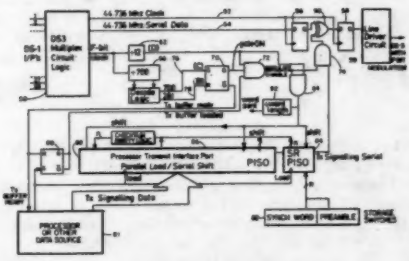
Wayne D. Grover, Edmonton, Canada, assignor to Alberta Telecommunications Research Centre, Alberta, Canada

Filed May 26, 1988, Ser. No. 199,742

Claims priority, application Canada, May 27, 1987, 538090

Int. Cl.[5] H04J *3/04, 3/06*

U.S. Cl. 370—110.1 **42 Claims**



1. A frame-bit modulation circuit for modulating an additional digital signal into a DS3 signal, said DS3 signal being a digital bit stream having F-bit framing bits at predetermined spaced intervals along said bit stream, each said framing bits having a characteristic pattern of bits for use in framing operations to hunt for and locate the true framing bits positions in said bit stream using an in-frame validation criteria of a predetermined number of consecutive framing bit positions having said characteristic pattern, said circuit comprising:

register means for holding a predetermined number of bits of said additional digital signal; and

means for adding in sequence said digital bits in said register to one of every D framing bits in said digital bit stream to produce a series of modulated framing bits representing said additional digital signal and wherein "D" is a modulation spacing and is an integer greater than said validation criteria, said adding means being operable to add said digital bits in said register only to F-bits occurring within a modulation period of a modulation cycle, said modulation cycle having a non-modulation period within which no F-bits are modified and within which said in-frame validation criteria are satisfied.

4,967,412

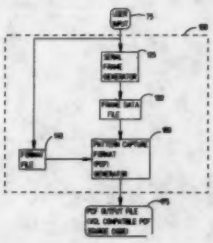
SERIAL DATA FRAME GENERATOR FOR TESTING TELECOMMUNICATIONS CIRCUITS

Christopher B. Cain; Robert E. McAuliffe; Lynn A. Schmidt; Elaine L. May, all of Loveland, and John E. Siefers, Fort Collins, all of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 8, 1988, Ser. No. 179,373

Int. Cl.[5] G01R *31/28;* **G06F** *11/00*

U.S. Cl. 371—20.1 **3 Claims**



1. In a circuit board tester, a data-frame generator for generating data-frames for use in testing telecommunications circuits and other circuit devices which require data which must conform to a user-selected data-frame protocol, said generator comprising:

computing means, incorporated in said circuit board tester, for controlling the operation of said generator;

data generation means for generating user-specified input information;

data framing means for inserting said user-specified input information into data-frames which conform to a user-selected protocol;

data-sequence generation means for generating data sequences from said data-frames which data-sequences are executable by said computing means.

4,967,413

BURST SIGNAL DETECTION APPARATUS

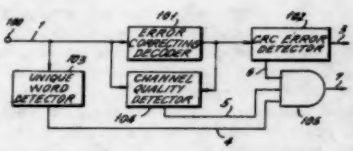
Susumu Otani, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Jul. 24, 1987, Ser. No. 77,163

Claims priority, application Japan, Jul. 26, 1986, 61-176357

Int. Cl.[5] H04B *1/10;* **H04L** *1/20;* **H03M** *13/00, 13/12*

U.S. Cl. 371—37.4 **3 Claims**



1. A burst signal detection apparatus, comprising:

a unique word detector means for receiving a burst signal of the type comprising a unique word followed by data that has undergone a cyclic redundancy check coding and error-correction coding and for detecting the unique word from the burst signal;

an error-correcting decoder means for decoding an error-correction code used with the data;

a cyclic redundance check detector means for receiving

decoded data from the error-correcting decoder for detecting any cyclic redundance check error;

a channel quality detector means for detecting quality of the channel on which the burst signal is received; and

an output circuit for providing an output signal indicating presence or absence of error in the data in response to outputs of the unique word detector means, the cyclic redundancy check detector means, and the channel quality means;

the output circuit comprising an AND gate with inputs from the word detector means, the cyclic redundance check error detector means, and the channel quality detector means.

4,967,414

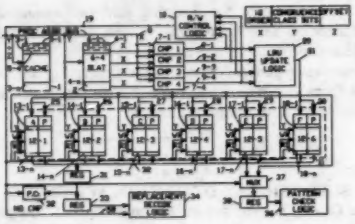
LRU ERROR DETECTION USING THE COLLECTION OF READ AND WRITTEN LRU BITS

Robert F. Lusch, Vestal, N.Y., and Jeffrey J. Dulzo, Columbus, Ohio, assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jan. 6, 1989, Ser. No. 294,021

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—51.1 **8 Claims**



1. A system for producing and error checking a binary code pattern signifying the order of replacement of units in a plurality of units randomly used in sequence, comprising

a plurality of storage elements, one for each logical bit in the pattern, for storing the pattern;

means associated with each of the units for producing signals indicating the use of the associated unit;

logic means, connected to the storage elements and to the signal producing means, for producing update bits for only certain of the pattern bits;

separate read/write controls connected to the signal producing means, for each storage element, for writing the update bits into only certain of said storage elements in accordance with said use signals and for reading unchanged pattern bits from the storage elements other than said certain elements;

means, connected to the logic means and to the storage elements, for collecting the updated pattern bits from the logic means and unchanged pattern bits from the storage elements; and

pattern checking means connected to the collecting means for determining the validity or non-validity of the collected pattern.

4,967,415

EEPROM SYSTEM WITH BIT ERROR DETECTING FUNCTION

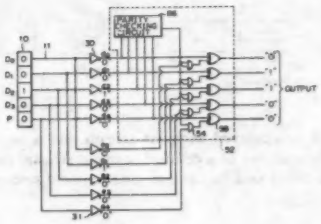
Tanagawa: Kouzi, Tokyo, Japan, assignor to OKI Electric Industry Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,296

Claims priority, application Japan, Sep. 18, 1987, 62-232526

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—51.1 **34 Claims**



1. A memory device comprising:

(a) a plurality of word lines;

(b) a plurality of sense lines;

(c) a plurality of MOS memory cells connected separately to said word lines and said sense lines;

(d) a plurality of bit lines connected separately to said MOS memory cells;

(e) a plurality of read circuits connected separately to said plurality of the bit lines for reading and outputting data stored in said MOS memory cells; and

(f) a plurality of intermediate state detecting circuits connected separately to said bit lines each for detecting an intermediate state of one of said MOS memory cells other than writing and erasing states of said memory cells and for outputting an error bit indicating signal in response thereto.

4,967,416

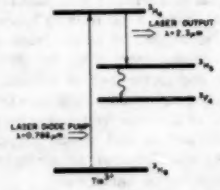
THULIUM-DOPED FLUOROZIRCONATE FIBER LASER PUMPED BY A DIODE LASER SOURCE

Leon Esterowitz, Springfield, and Roger E. Allen, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 28, 1990, Ser. No. 486,638

Int. Cl.[5] H01S *3/30*

U.S. Cl. 372—6 **33 Claims**



1. A laser system comprising:

a fiber laser having a laser fiber doped with a thulium activator ion concentration sufficient to produce an output CW laser emission at a wavelength in the range of 2.4–2.5 microns when said fiber laser is pumped by a CW pump beam, said laser fiber being selected from the group consisting of fluorozirconate fiber, fluorophosphate fiber and low-loss, water-free silica fiber; and

diode means for emitting a CW pump beam at a wavelength that will be absorbed by the thulium activator ions in the

$^3H_4$ or higher energy level of the thulium in said fiber laser.

4,967,417

LASER DRIVING DEVICE PROVIDED WITH TWO REFERENCE SIGNAL SOURCES, AND OPTICAL INFORMATION RECORDING APPARATUS USING THE SAME DEVICE

Etsuo Yamada, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,131

Claims priority, application Japan, Jul. 12, 1988, 63-171743

Int. Cl.[5] H01S *3/10*

U.S. Cl. 372—29 **5 Claims**

1. A laser driving device comprising:

a semiconductor laser;

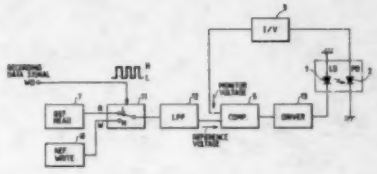
a current source for supplying electric current to said semiconductor laser;

a photodetector for monitoring light emitted from said semiconductor laser and for generating a photodetector output;

a plurality of setting circuits for outputting reference signals of different levels;

a switching circuit for selecting one of the reference signals output from said setting circuits and for outputting the selected reference signal;

a comparing circuit for comparing the reference signal output selected by said switching circuit with the output of said photodetector and for generating a comparison output;



a low-pass filter for filtering the reference signal output from said switching circuit and for inputting the filtered reference signal to said comparing circuit; and

a control circuit for controlling the electric current supplied to said semiconductor laser on the basis of the output of said comparing circuit so that the reference signal output and the photodetector output equal each other.

DESIGN PATENTS

GRANTED OCT. 30, 1990

ERRATA

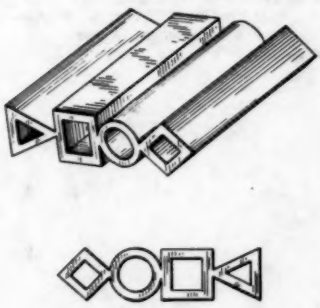
For CLASS	See PATENT NO.
D13-133	311,733
D19-034	311,751

DESIGNS

OCTOBER 30, 1990

311,625
PASTA
Philippe Starck, 4 Rue de Dion, Levallois Perret, France (92300)
Filed Aug. 11, 1987, Ser. No. 83,956
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

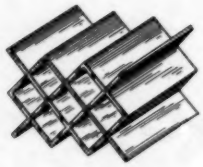
311,626
PASTA
Philippe Starck, 4 Rue de Dion, Levallois Perret, France (92300)
Filed Aug. 11, 1987, Ser. No. 83,957
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

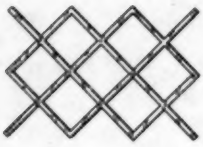


311,627
PASTA
Michel Cadestin, 115 Rue Oberkampf, Paris 75011, France
Filed Aug. 11, 1987, Ser. No. 83,953
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

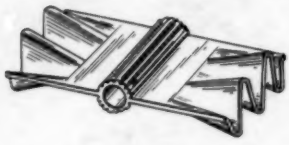
311,628
PASTA
Francois Scali, and Alain Domingo, both of 17 rue Fremont, 75011 Paris, France
Filed Aug. 11, 1987, Ser. No. 83,954
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

311,629
PASTA
Christina Ragot, 56 Avenue Général de Gaulle, Ozoir Laferrière 77330, France
Filed Aug. 11, 1987, Ser. No. 83,994
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

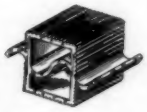




311,630
PASTA
Francois Scali, and Alain Domingo, both of 17 Froment, 75011 Paris, France
Filed Aug. 11, 1987, Ser. No. 83,952
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126

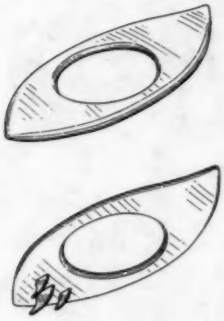


311,631
PASTA
Francois Scali, and Alain Domingo, both of 17 rue Froment, 75011 Paris, France
Filed Aug. 11, 1987, Ser. No. 83,951
Claims priority, application France, Feb. 26, 1987, 87 1096
Term of patent 14 years
U.S. Cl. D1—126



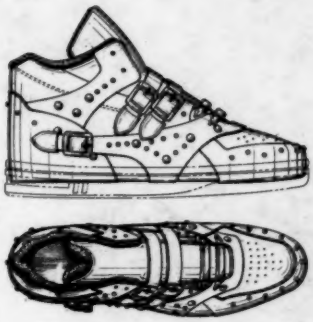
311,632
PAIR OF UNDERSHORTS
Tony D. Beam, P.O. Box 777, Stanley, N.C. 28164
Filed May 19, 1987, Ser. No. 52,561
Term of patent 14 years
U.S. Cl. D2—10

311,633
HAT
Scott W. MacDonald, 34 Abbey Road, Brampton, Ontario, Canada (L6W 2T8)
Filed Jun. 16, 1988, Ser. No. 207,600
Term of patent 14 years
U.S. Cl. D2—252



311,634
SHOE UPPER
Patricia D. Quan, Hermosa Beach, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Nov. 16, 1988, Ser. No. 272,201
Term of patent 14 years
U.S. Cl. D2—314

311,635
SHOE UPPER
Ric Claveria, Loma Linda, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Mar. 1, 1990, Ser. No. 490,942
Term of patent 14 years
U.S. Cl. D2—314



311,636
SHOE UPPER
Janell Magdaleno, Rosemead, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Feb. 16, 1990, Ser. No. 482,397
Term of patent 14 years
U.S. Cl. D2—314

311,637
ELEMENT FOR A SHOE UPPER
Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.
Filed Apr. 25, 1990, Ser. No. 514,358
Term of patent 14 years
U.S. Cl. D2—314

311,638

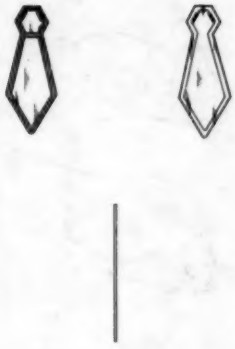
NECKTIE

Eileen M. Bungert-Chen, 2441 Schubert Ave., San Jose, Calif. 95124

Filed Aug. 4, 1987, Ser. No. 81,887

Term of patent 14 years

U.S. Cl. D2—605



311,639

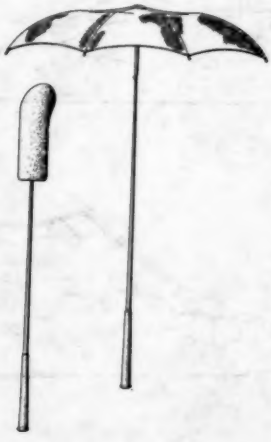
COMBINED UMBRELLA AND COVER THEREFOR

Rene L. Ibanez, 3520 Jermantown Rd., Fairfax, Va. 22030

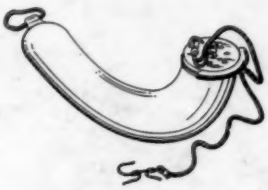
Filed Jun. 5, 1987, Ser. No. 58,539

Term of patent 14 years

U.S. Cl. D3—5



311,640
FISH BAG
Cornel J. Grengs, 4405 Nokomis Ave. South, Minneapolis, Minn. 55406
Filed Nov. 27, 1987, Ser. No. 126,289
Term of patent 14 years
U.S. Cl. D3—38



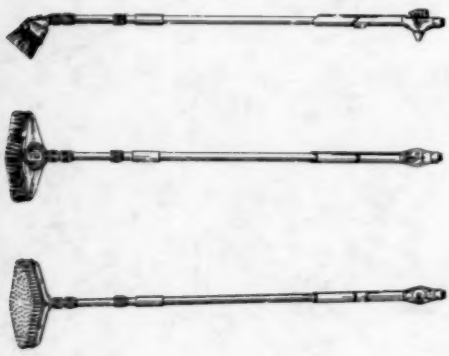
311,641
QUIVER HOOD FOR ARCHERY BOWS
Terry G. Martin, Walla Walla, Wash., assignor to Martin Archery, Inc., Walla Walla, Wash.
Filed Apr. 17, 1987, Ser. No. 39,663
Term of patent 14 years
U.S. Cl. D3—38

311,642
KNIFE KEY HOLDER
Sumner B. MacDonald, 39 Sea Breeze La., Bristol, R.I. 02809
Filed Jun. 29, 1987, Ser. No. 67,170
Term of patent 14 years
U.S. Cl. D3—62

311,643
KNIFE KEY HOLDER
Sumner B. MacDonald, 39 Sea Breeze La., Bristol, R.I. 02809
Filed Jun. 26, 1987, Ser. No. 66,780
Term of patent 14 years
U.S. Cl. D3—62

311,644
MOLDED TOOL CASE
David S. Chapin, and Rod E. Morton, both of Raleigh, N.C., assignors to Cooper Industries, Inc., Houston, Tex.
Filed Jan. 15, 1987, Ser. No. 3,661
Term of patent 14 years
U.S. Cl. D3—30.1

311,645
FOUNTAIN BRUSH
Roger M. Warwick, and Simon Roberts, both of Stockport, England, assignors to Thomas French & Son PLC, Manchester, England
Filed Dec. 30, 1987, Ser. No. 139,366
Claims priority, application United Kingdom, Jul. 3, 1987, 1043235
Term of patent 14 years
U.S. Cl. D4—115

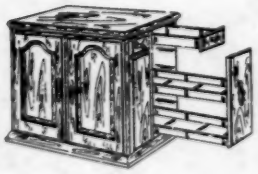


311,646
SHEET MATERIAL WITH ENGRAVED LACE PATTERN
Chantal Thomas, 14 Ruite De La Troche 78490 Grosrouvre, France, assignor to Chantal Thomas, Paris, France
Filed Jan. 15, 1988, Ser. No. 144,860
Term of patent 14 years
U.S. Cl. D5—24

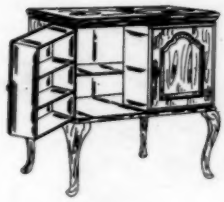
311,647
CHAIR
Larry A. Schwartz, Hartsdale, and Terrence Gibbs, Nyack, both of N.Y., assignors to Omni Products International, Inc., Fairfield, N.J.
Filed May 15, 1987, Ser. No. 51,007
Term of patent 14 years
U.S. Cl. D6—370

311,648
COMBINED FOOTSTOOL AND ADJUSTABLE TABLE
Stella M. Pevsner, 1540 N. State Pkwy., Apt. 16C, Chicago, Ill. 60610
Filed Aug. 24, 1987, Ser. No. 88,603
Term of patent 14 years
U.S. Cl. D6—397

311,649
CABINET
H. Thomas Keller, High Point, N.C., assignor to Rosal Co., Inc., Louisville, Ky.
Filed Dec. 5, 1989, Ser. No. 446,166
Term of patent 14 years
U.S. Cl. D6—445



311,650
CABINET
H. Thomas Keller, High Point, N.C., assignor to Rosalco., Inc., Louisville, Ky.
Filed Dec. 7, 1989, Ser. No. 447,260
Term of patent 14 years
U.S. Cl. D6—446

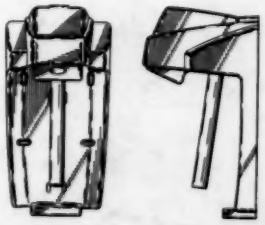


311,651
PAN LID HOLDER
Lowell L. Fetty, 4603 S. Rte. 47, Woodstock, Ill. 60102
Filed Oct. 20, 1987, Ser. No. 110,440
Term of patent 14 years
U.S. Cl. D6—462

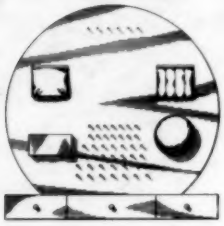
311,652
CABINET
Mark J. Feller, 89 Meadowwood Dr. C-3, Carbondale, Colo. 81623
Filed May 27, 1987, Ser. No. 54,681
Term of patent 14 years
U.S. Cl. D6—471

311,653
LIQUID SOAP DISPENSING CONTAINER
Jerome I. Lindauer, Hillsdale, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.
Filed Dec. 13, 1988, Ser. No. 283,902
Term of patent 14 years
U.S. Cl. D6—542

311,654
SOAP DISPENSER
Thom Kearnes, Akron, and Robert Futo, Stongsville, both of Ohio, assignors to State Chemical Manufacturing Company, Cleveland, Ohio
Filed Dec. 16, 1988, Ser. No. 285,875
Term of patent 14 years
U.S. Cl. D6—545

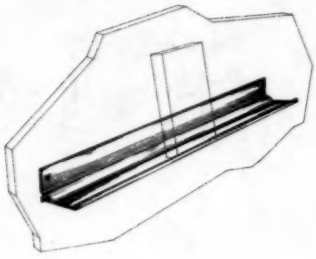


311,655
RACK FOR SEWING SUPPLIES
Joyce R. Meloche, 1012 Prado Place, Windsor, Ontario, Canada (N8S 2H7)
Filed Oct. 17, 1988, Ser. No. 258,332
Claims priority, application Canada, Apr. 15, 1988, 15-04-88-4
Term of patent 14 years
U.S. Cl. D6—573

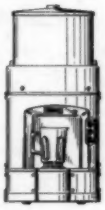


311,656
SOAP HOLDER
Hsu-Chieh Yeh, and Quey-Mei Yeh, both of 1174 Bucknell Dr., Monroeville, Pa. 15146
Filed Jun. 6, 1988, Ser. No. 202,939
Term of patent 14 years
U.S. Cl. D6—536

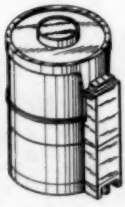
311,657
MODULAR VIDEO CASSETTE DISPLAY RACK
J. Stephen Pate, 5339 Stonetrace, Gainesville, Ga. 30501
Filed Sep. 22, 1988, Ser. No. 247,927
Term of patent 14 years
U.S. Cl. D6—574



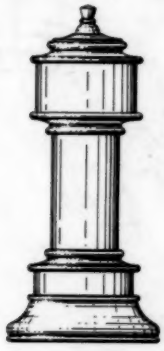
311,658
MACHINE FOR MAKING SOFT ICE DRINK
Yoshihiko Mitsubayashi, Kuwana, Japan, assignor to Chubu Industries, Inc., Kuwana, Japan
Filed Jun. 15, 1987, Ser. No. 63,559
Claims priority, application Japan, Dec. 18, 1986, 61-50113
Term of patent 14 years
U.S. Cl. D7—378



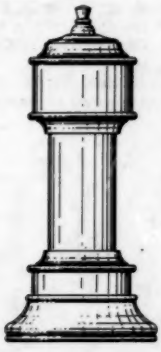
311,659
FOOD PROCESSOR
Günter Storsberg, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany
Filed Nov. 9, 1987, Ser. No. 118,519
Term of patent 14 years
U.S. Cl. D7—384



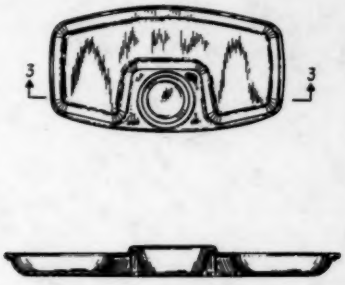
311,660
STANCHION FOR A BEVERAGE TAP
Michael J. Start, Dorset, England, assignor to Homark Associates Limited, Dorset, Great Britain
Filed Mar. 27, 1987, Ser. No. 31,384
Claims priority, application United Kingdom, Oct. 7, 1986, 1037216
Term of patent 14 years
U.S. Cl. D7—397



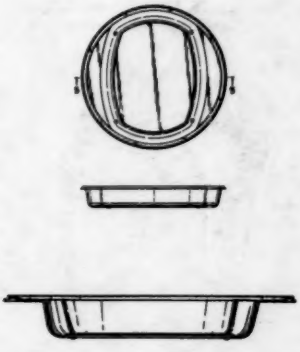
311,661
STANCHION FOR A BEVERAGE TAP
Michael J. Start, Poole, England, assignor to Homark Associates Limited, Dorset, Great Britain
Filed Mar. 27, 1987, Ser. No. 31,383
Claims priority, application United Kingdom, Oct. 7, 1986, 1037215
Term of patent 14 years
U.S. Cl. D7—397



311,662
FOOD TRAY WITH CUP HOLDER
Moises B. Lorenzana, 601 Lake Hinsdale Dr., Willowbrook, Ill. 60559, and Vance A. Lorenzana, 698 Spring Hill Cir., Naperville, Ill. 60540
Filed Sep. 28, 1987, Ser. No. 101,547
Term of patent 14 years
U.S. Cl. D7—505



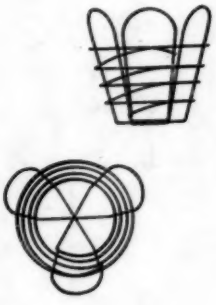
311,663
DISH
Douglas K. Gatward, 1212 Great Cambridge Road, Enfield, Middlesex, Great Britain
Filed Mar. 18, 1987, Ser. No. 27,504
Claims priority, application United Kingdom, Sep. 19, 1986, 1036803
Term of patent 14 years
U.S. Cl. D7—545



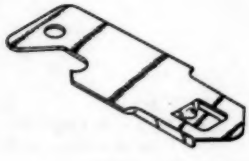
311,664
SPICE SHAKER
Delbert W. Stevens, Jr., 164 W. Burton Pl., Chicago, Ill. 60610
Filed Oct. 13, 1988, Ser. No. 257,300
Term of patent 14 years
U.S. Cl. D7—591

311,665
FOOD CONTAINER
Arthur R. Carlson, East Malvern, Australia, assignor to The Decor Corporation Proprietary Limited, Victoria, Australia
Filed Aug. 26, 1988, Ser. No. 237,004
Term of patent 14 years
U.S. Cl. D7—601

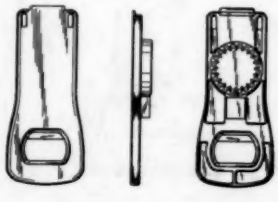
311,666
TREE ROOT BALL BASKET
Alfred N. Burke, Warren County, Tenn., assignor to Great Western Manufacturing Co., McMinnville, Tenn.
Filed Sep. 10, 1987, Ser. No. 95,514
Term of patent 14 years
U.S. Cl. D8—1



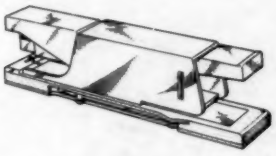
311,667
CAN AND BOTTLE OPENER
Talal Cholagh, 3565 Chapel Dr., Sterling Heights, Mich. 48310
Filed Mar. 14, 1988, Ser. No. 167,437
Term of patent 14 years
U.S. Cl. D8—18



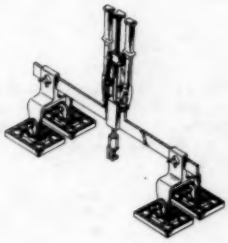
311,668
THREE-WAY OPENER
David R. Bryant, Perrysburg; Werner W. Kochte, Streetsboro, both of Ohio, and Edward F. Trombly, Huntington Woods, Mich., assignors to The Scott Fetzer Company, Westlake, Ohio
Filed Oct. 12, 1988, Ser. No. 256,924
Term of patent 14 years
U.S. Cl. D8—40



311,669
COMBINED STAPLER AND PERFORATOR
Hisano Sato, Daini-Hikariso, 10, Toyotamaminami 3-chome, Nerima-ku, Tokyo, Japan
Filed Apr. 20, 1988, Ser. No. 184,541
Claims priority, application Japan, Oct. 24, 1987, 62-43490
Term of patent 14 years
U.S. Cl. D8—50

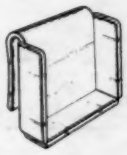


311,670
DENT PULLER
Kousei Ishihara, 55-7 Takashimadaira 1-chome, Itabashi-ku, Tokyo, Japan
Filed Oct. 26, 1987, Ser. No. 114,132
Claims priority, application Japan, May 6, 1987, 62-17422
Term of patent 14 years
U.S. Cl. D8—526211



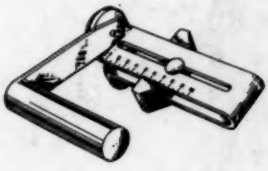
311,671
SPARK PLUG WIRE PULLER
Budde A. Wolfe, 9421 Tedford La., Knoxville, Tenn. 37922
Filed Sep. 29, 1986, Ser. No. 912,818
Term of patent 14 years
U.S. Cl. D8—52

311,672
PUTTY HOLDER
Donald R. Johnson, 2800 21st Pl., Vero Beach, Fla. 32960
Filed Jul. 6, 1987, Ser. No. 69,883
Term of patent 14 years
U.S. Cl. D8—71

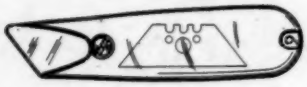


311,673
CUTTER FOR TRIMMING CEILING PAINT
Donald R. Johnson, 3965 Cocoplum Cir. #E, Coconut Creek, Fla. 33063
Filed Sep. 3, 1987, Ser. No. 92,707
Term of patent 14 years
U.S. Cl. D8—98

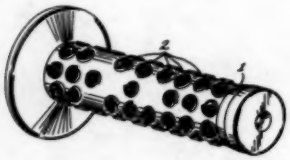
311,674
GYPSUM WALLBOARD CUTTER
Magnus Löfgren, Stockholm, Sweden, assignor to AB Gyproc, Malmo, Sweden
Filed Apr. 16, 1987, Ser. No. 38,922
Claims priority, application Sweden, Oct. 16, 1986, 86-2386
Term of patent 14 years
U.S. Cl. D8—98



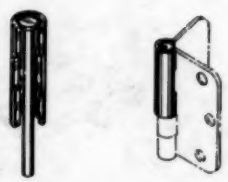
311,675
COMBINED KNIFE HANDLE AND BLADE HOLDER THEREFOR
Allan Wilson, Malone, and William E. Carder, Fairport, both of N.Y., assignors to Carder Industries, Inc., Fairport, N.Y.
Filed Jul. 31, 1987, Ser. No. 80,387
Term of patent 14 years
U.S. Cl. D8—98



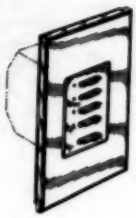
311,676
BICYCLE HANDLEBAR GRIP
Kenneth L. Neal, 18903 Anelo Ave., Gardena, Calif. 90248
Filed Jun. 17, 1988, Ser. No. 209,047
Term of patent 14 years
U.S. Cl. D8—303



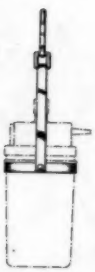
311,677
HINGE PIN STOP
David D. Headrick, 2309 Autumn La., Oklahoma City, Okla. 73170
Filed Sep. 15, 1988, Ser. No. 244,359
Term of patent 14 years
U.S. Cl. D8—323



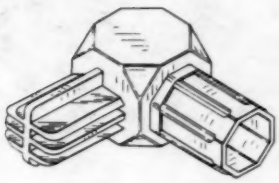
311,678
SELECTABLE LEVEL LIGHTING CONTROL FACEPLATE
John T. Graef, Erwinna, and Michael J. Rowen, Center Valley, both of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.
Filed Sep. 26, 1988, Ser. No. 249,462
Term of patent 14 years
U.S. Cl. D8—353



311,679
HOLDER FOR OXYGENATOR BOTTLE
George R. Morris, 2031 Webb St., Stockton, Calif. 95205
Filed Aug. 7, 1989, Ser. No. 389,934
Term of patent 14 years
U.S. Cl. D8—373



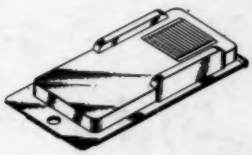
311,680
FRAME CORNER CONNECTOR
David E. Miall, Dartford, Great Britain, assignor to Display Systems International Ltd., Dartford, United Kingdom
Filed Sep. 30, 1988, Ser. No. 252,199
Claims priority, application United Kingdom, Mar. 30, 1988, 1049619
Term of patent 14 years
U.S. Cl. D8—382



311,681
BOTTLE
Rajkumar S. Aggarwal, Fairport, N.Y., assignor to Manufacturers Hanover Trust Co., New York, N.Y.
Filed Apr. 13, 1987, Ser. No. 37,572
Term of patent 14 years
U.S. Cl. D9—387

311,682
BOTTLE
Marcel Vandebroek, Grimbergen, Belgium, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Nov. 25, 1987, Ser. No. 126,145
Claims priority, application Spain, May 27, 1987, 113 162
The portion of the term of this patent subsequent to Oct. 20, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—404

311,683
CONTAINER FOR LOTTERY TICKETS
Keyvan T. Diba, 11841 Goshen Ave., Los Angeles, Calif. 90049, and Allan M. Shapiro, 15315 Magnolia Blvd., #105, Sherman Oaks, Calif. 91403
Filed Apr. 11, 1988, Ser. No. 180,267
Term of patent 14 years
U.S. Cl. D9—415



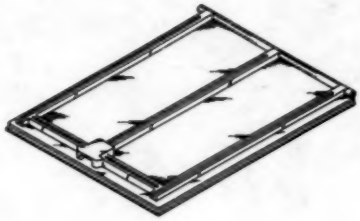
311,684
PRESENTATION BOX
Robert E. Newell, Pinner, and Paul K. Rand, Hitchin, both of England, assignors to Glaxo Group Limited, London, England
Filed Feb. 25, 1987, Ser. No. 18,954
Claims priority, application United Kingdom, Aug. 29, 1986, 1036398; Aug. 29, 1986, 1036399
Term of patent 14 years
U.S. Cl. D9—418

311,685
BOX
Tsutomu Tozawa, Urayasu, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Nov. 2, 1987, Ser. No. 116,290
Term of patent 14 years
U.S. Cl. D9—423

311,686
BOX
Tsutomu Tozawa, Urayasu, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Nov. 2, 1987, Ser. No. 116,289
Term of patent 14 years
U.S. Cl. D9—423

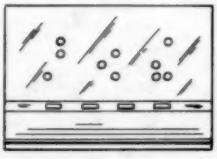
311,687
FOOD CONTAINER
Frederick B. Hadtke, New Providence, N.J., assignor to Hercules Incorporated, Wilmington, Del.
Filed Feb. 19, 1988, Ser. No. 158,151
Term of patent 14 years
U.S. Cl. D9—425

311,688
CONTAINER COVER
John E. Hodge, P.O. Box 309, Moline, Ill. 61265
Filed Mar. 4, 1987, Ser. No. 22,231
Term of patent 14 years
U.S. Cl. D9—435

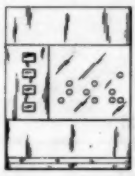


311,689
ELECTRONIC THERMOMETER PROBE
Tetsuya Ide, Fujinomiya, and Kenichi Kida, Tokyo, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 5, 1988, Ser. No. 152,579
Claims priority, application Japan, Oct. 21, 1987, 62-42746
Term of patent 14 years
U.S. Cl. D10—60

311,690
CLOCK
Rudy Krolopp, Barrington Hills, Ill., assignor to Cimtron Corp., Wood Dale, Ill.
Filed May 15, 1987, Ser. No. 51,010
Term of patent 14 years
U.S. Cl. D10—15



311,691
CLOCK
Rudy Krolopp, Barrington Hills, Ill., assignor to Cimtron Corp., Wood Dale, Ill.
Filed May 15, 1987, Ser. No. 51,037
Term of patent 14 years
U.S. Cl. D10—15

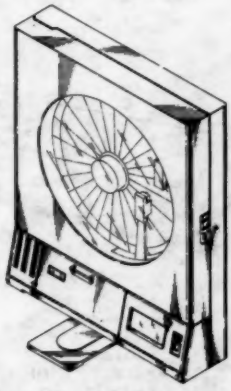


311,692
CLOCK
Hidekatsu Nomizu, at Twin Bird Industrial Co., Ltd., 1559-3 Azakatamukai, Oazashimonakano, Yoshida-machi,Nishikanbara-gun, Niigata-ken, Japan
Filed Nov. 25, 1986, Ser. No. 934,928
Claims priority, application Japan, May 26, 1986, 61-20200
Term of patent 14 years
U.S. Cl. D10—22

311,693
WRISTWATCH
Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114
Filed Mar. 26, 1987, Ser. No. 30,916
Term of patent 14 years
U.S. Cl. D10—39

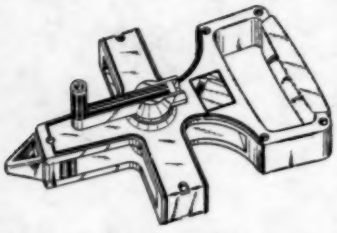
311,694
WRISTWATCH
Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114
Filed Mar. 26, 1987, Ser. No. 36,095
Term of patent 14 years
U.S. Cl. D10—39

311,695
CHART RECORDER
Milton B. Hollander; Laszlo Tapolcai, and George R. Rounds, all of Stamford, Conn., assignors to Omega Engineering, Inc., Stamford, Conn.
Filed Jun. 10, 1988, Ser. No. 205,109
Term of patent 14 years
U.S. Cl. D10—46

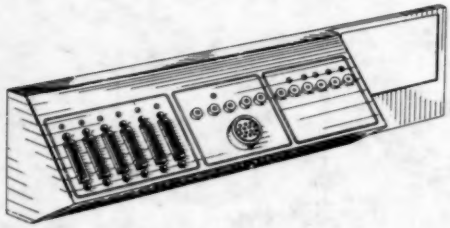


311,696
ELECTRONIC THERMOMETER PROBE
Tetsuya Ide, Fujinomiya, and Kenichi Kida, Tokyo, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 5, 1988, Ser. No. 152,580
Claims priority, application Japan, Oct. 21, 1987, 62-42744
Term of patent 14 years
U.S. Cl. D10—60

311,697
MEASURING TAPE CASE
Dong M. Kang, Seoul, Rep. of Korea, assignor to Korea Measures Co., Ltd., Busan, Rep. of Korea
Filed Mar. 16, 1988, Ser. No. 168,758
Claims priority, application Rep. of Korea, Dec. 28, 1987, 19376/1987
Term of patent 14 years
U.S. Cl. D10—72

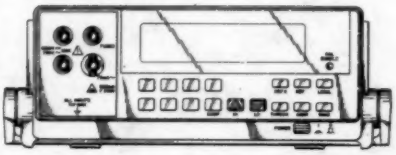


311,698
IN-CIRCUIT TESTER CONSOLE
Royal Elmore, and Henrick Y. Krigel, both of San Antonio, Tex., assignors to Protech, Inc., San Antonio, Tex.
Filed May 13, 1987, Ser. No. 50,209
Term of patent 14 years
U.S. Cl. D10—75

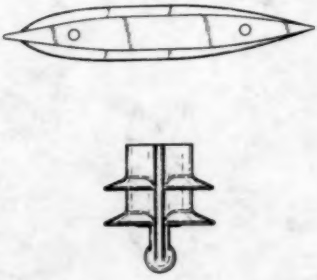


311,699
BATTERY AND BULB INDICATOR
Hai-Ning Mo, No.6-1,Lane 220,Chung Yang Rd., Feng Yuan City, Taichung Hsien, Taiwan
Filed Feb. 24, 1987, Ser. No. 18,009
Term of patent 14 years
U.S. Cl. D10—78

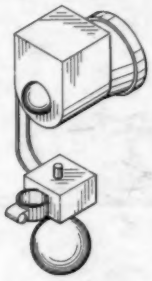
311,700
DIGITAL MULTIMETER
Michael D. Nelson, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.
Filed Feb. 8, 1988, Ser. No. 153,792
Term of patent 14 years
U.S. Cl. D10—78

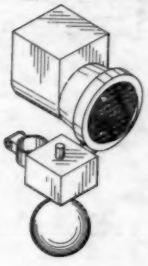


311,701
TRANSDUCER MOUNTING FOR USE WITH A TRANSDUCER SYSTEM FOR MEASURING THE SPEED OF MARINE VEHICLES THROUGH THE WATER
Jeremy Bird, Lymington, Great Britain, assignor to Brookes & Gatehouse Limited, Great Britain
Filed Jun. 1, 1987, Ser. No. 57,001
Claims priority, application United Kingdom, Dec. 2, 1986, 1038474
Term of patent 14 years
U.S. Cl. D10—98



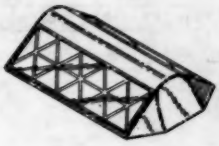
311,702
SUMP PUMP FAILURE ALARM
Jeffrey J. Kera, 3990 Townline, Birch Run, Mich. 48415
Filed Aug. 6, 1987, Ser. No. 82,364
Term of patent 14 years
U.S. Cl. D10—106



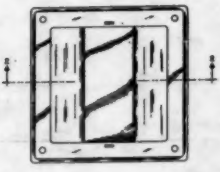


311,703
SMOKE DETECTOR
Kenneth R. Fenne, Glen Ellyn, Ill., assignor to Pittway Corporation, Northbrook, Ill.
Filed May 18, 1987, Ser. No. 51,016
Term of patent 14 years
U.S. Cl. D10—106

311,704
PAVEMENT MARKER
David C. May, Roberts, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Jun. 30, 1988, Ser. No. 214,134
Term of patent 14 years
U.S. Cl. D10—113

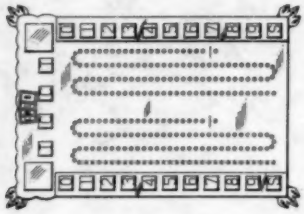


311,705
COMBINED ELECTRICAL OUTLET COVER AND MOUNTING PLATE FOR STROBE LIGHT FOR FIRE ALARM SYSTEMS OR THE LIKE
Edward J. Thorp, New Lenox, and Kenneth R. Fenne, Glen Ellyn, both of Ill., assignors to Pittway Corporation, Northbrook, Ill.
Filed May 18, 1987, Ser. No. 51,018
Term of patent 14 years
U.S. Cl. D10—121



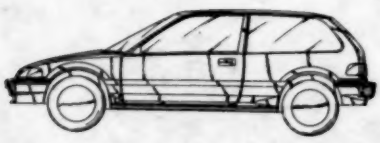
311,706
WATCH SUPPORT
Hans Zaugg, Derendingen, and Olivier Koch, Eschert, both of Switzerland, assignors to Swatch, SA, Bienne, Switzerland
Filed Nov. 18, 1987, Ser. No. 123,058
Claims priority, application World Int. Prop. O., May 18, 1987, DM/008 664
Term of patent 14 years
U.S. Cl. D10—128

311,707
CRIBBAGE BOARD
Steven D. Clements, 1519 Drummond St., Eau Claire, Wis. 54701
Filed Dec. 1, 1988, Ser. No. 278,420
Term of patent 14 years
U.S. Cl. D10—46.1

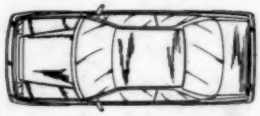


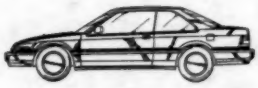
311,708
BADGE
Charles S. Rankin, P.O. Box 25426, Charlotte, N.C. 28229
Filed Oct. 5, 1987, Ser. No. 104,485
Term of patent 14 years
U.S. Cl. D11—95

311,709
AUTOMOBILE
Yoshinao Fujimura, and Yusuki Saito, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed May 4, 1987, Ser. No. 46,421
Term of patent 14 years
U.S. Cl. D12—91

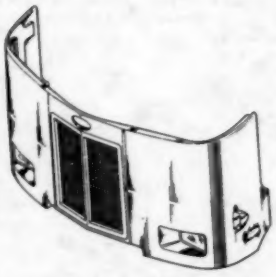


311,710
AUTOMOBILE
Nishimura Tsuyoshi, Tochiga; Tsuji Takahito, Tokyo, and Honma Iwao, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 8, 1988, Ser. No. 152,576
Claims priority, application Japan, Aug. 8, 1987, 62-32338
Term of patent 14 years
U.S. Cl. D12—92





311,711
INTEGRAL TRUCK CAB FRONT NOSE PANEL, GRILLE AND RECESSED HEADLIGHTS
Huston Marlowe, Orinda, and John Foot, Fremont, both of Calif., assignors to Paccar, Inc., Bellevue, Wash.
Filed Sep. 15, 1988, Ser. No. 245,070
Term of patent 14 years
U.S. Cl. D12—96



311,712

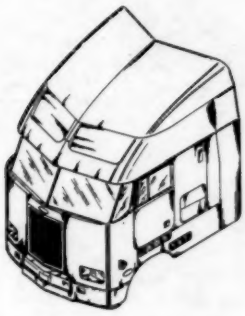
EXTERIOR SHELL OF A TRUCK CAB BODY

Huston Marlowe, Orinda; Virgil E. Pound, San Jose; John Foot, Fremont; Jeff Paul, Union City; Bob Ray, Fremont, and Michikazu Tao, Castro Valley, all of Calif., assignors to Paccar Inc., Bellevue, Wash.

Filed Sep. 15, 1988, Ser. No. 245,019

Term of patent 14 years

U.S. Cl. D12—96



311,713

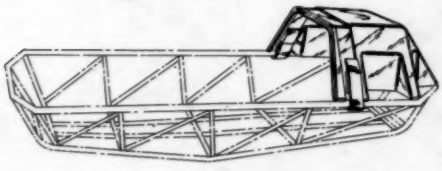
SAFETY SHIELD FOR A PORTABLE LITTER

Kevin E. McAfee; Sean A. McAfee, both of 28936 Selfridge Dr., and Stephen M. Todd, 22159 Pacific Coast Hwy., all of Malibu, Calif. 90265

Filed Jun. 1, 1987, Ser. No. 56,528

Term of patent 14 years

U.S. Cl. D12—133



311,714

CARGO ANCHOR UNIT

Hans U. Koezle, 13209 Barton Cir., Santa Fe Springs, Calif. 90670

Filed Jul. 27, 1987, Ser. No. 78,244

Term of patent 14 years

U.S. Cl. D12—155

311,715

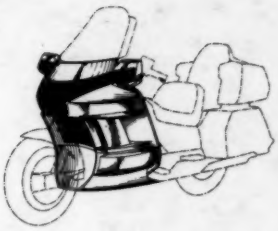
EXTERIOR SHELL OF A MOTORCYCLE FRONT FAIRING UNIT

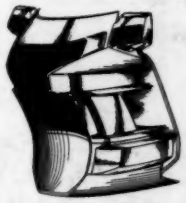
Toshiyuki Yamada, Saitama, and Eiji Hamano, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

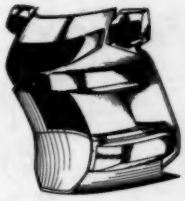
Filed Nov. 20, 1987, Ser. No. 123,170

Term of patent 14 years

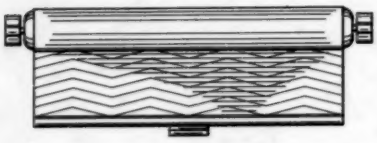
U.S. Cl. D12—182





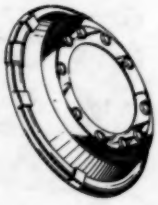


311,716
VEHICLE VISOR-SHADE
Craig J. Widrig, 105 Continental Dr., Lockport, N.Y. 14094
Filed Jan. 25, 1988, Ser. No. 147,686
Term of patent 14 years
U.S. Cl. D12—191

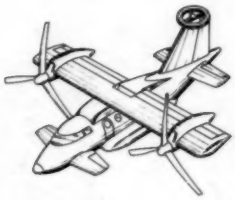


311,717
AUTOMOBILE WHEEL
Tomoaki Yoshida, Shizuoka, Japan, assignor to Enbishi Aluminum Wheels Co., Ltd., Shizuoka, Japan
Filed Oct. 19, 1988, Ser. No. 259,960
Claims priority, application Japan, May 16, 1988, 63-18878
Term of patent 14 years
U.S. Cl. D12—211

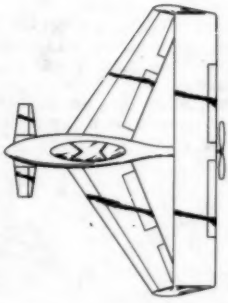
311,718
FRONT WHEEL BALANCER
Frank L. Whitsel, Grapevine, Tex., assignor to F & F Industries, Inc., Ft. Worth, Tex.
Continuation of Ser. No. 827,737, Feb. 10, 1986, abandoned. This application Mar. 3, 1989, Ser. No. 319,905
Term of patent 14 years
U.S. Cl. D12—213



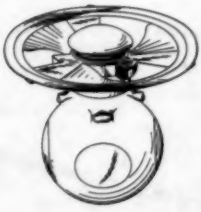
311,719
AIRCRAFT
Cecil W. Haga, Arlington, Tex., assignor to The Ishida Foundation, Nagoya, Japan
Filed Sep. 30, 1988, Ser. No. 252,714
Term of patent 14 years
U.S. Cl. D12—328



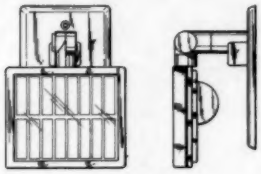
311,720
AIRCRAFT
Gerald L. Butler, 3121 E. Park Row #344, Arlington, Tex. 76010
Filed Nov. 14, 1988, Ser. No. 270,497
Term of patent 14 years
U.S. Cl. D12—331



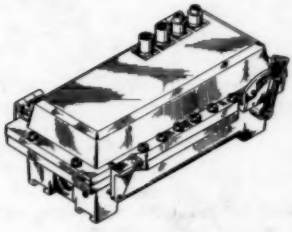
311,721
GYROSCOPIC PROPELLED/STABILIZED SUBMARINE
Francis J. Hanback, 15 Clipper Rd., Abalone Cove, Palos Verdes, Calif. 90274
Filed Aug. 18, 1988, Ser. No. 233,574
Term of patent 14 years
U.S. Cl. D12—308



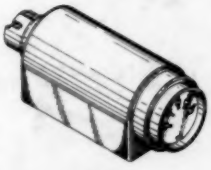
311,722
ADJUSTABLE SOLAR PANEL
Willis Cheng, Taipei, Taiwan, assignor to Woods Far East, Inc., Taipei, Taiwan
Filed Jul. 11, 1988, Ser. No. 216,981
Term of patent 14 years
U.S. Cl. D13—102



311,723
EXPLOSION-PROOF CONTROL ENCLOSURE
Robert D. Eggleston, Syracuse, and James A. Caryl, Camillus, both of N.Y., assignors to Cooper Industries, Inc., Houston, Tex.
Filed Nov. 28, 1988, Ser. No. 277,093
Term of patent 14 years
U.S. Cl. D13—162

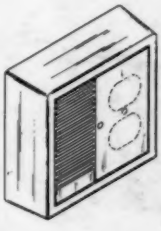


311,724
MINI-DIN ADAPTOR OR SIMILAR ARTICLE
George Y. Huang, Huntington Beach, Calif., assignor to Turn-Luckily International Inc., Huntington Beach, Calif.
Filed Jun. 21, 1988, Ser. No. 209,781
Term of patent 14 years
U.S. Cl. D13—146

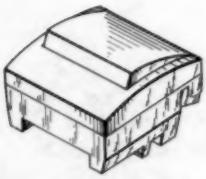


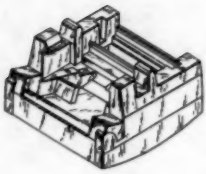
311,725
JACK
Masanori Tanaka, Osaka, and Ryusuke Amachi, Nishinomiya, both of Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan
Filed May 11, 1988, Ser. No. 192,758
Claims priority, application Japan, Nov. 26, 1987, 62-48539
Term of patent 14 years
U.S. Cl. D13—147

311,726
REMOTELY ACTIVATED SWITCH MODULE FOR CONTROLLING POWER USAGE OF AN APPLIANCE
Robert J. Brown, Jr., Boca Raton, Fla.; Bahattin Erturk, Rollingmeadows, and Jon W. Hauser, Geneva, both of Ill., assignors to Teletimer International, Inc., Boca Raton, Fla.
Filed Nov. 16, 1987, Ser. No. 121,579
Term of patent 14 years
U.S. Cl. D13—168



311,727
PUSH BUTTON
Gert Brandt, Rodovre, Denmark, assignor to MEC A/S, Ballerup, Denmark
Filed Jul. 28, 1988, Ser. No. 225,139
Claims priority, application Denmark, Jan. 28, 1988, 0109/88
Term of patent 14 years
U.S. Cl. D13—174

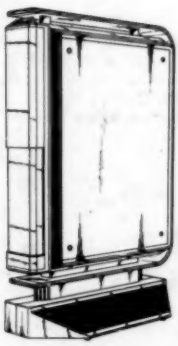




311,728
CENTRAL PROCESSING UNIT
Isamu Yoshitake, Fuchu, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Feb. 27, 1989, Ser. No. 316,447
Term of patent 14 years
U.S. Cl. D14—100

311,729
PERSONAL COMPUTER
Noritaka Uchihori, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan
Filed Dec. 1, 1988, Ser. No. 278,644
Claims priority, application Japan, Jun. 10, 1988, 63-23147
Term of patent 14 years
U.S. Cl. D14—100

311,730
COMPUTER
John Houghton, Billingstad, Norway, assignor to NCI Norsk Computer Industria, Sandnes, Norway
Filed Mar. 1, 1988, Ser. No. 162,467
Claims priority, application Norway, Jan. 7, 1988, 68984
Term of patent 14 years
U.S. Cl. D14—102



311,731

VIDEO CASSETTE RECORDER

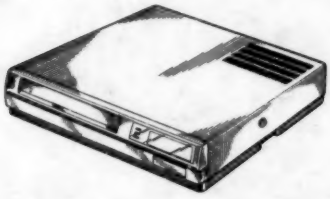
Doo S. Yang, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

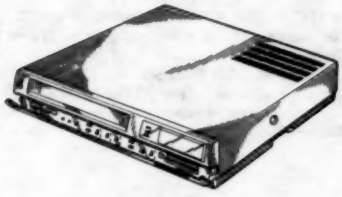
Filed Jun. 10, 1988, Ser. No. 204,784

Claims priority, application Rep. of Korea, Dec. 11, 1987, 18540

Term of patent 14 years

U.S. Cl. D14—135





311,732

VIDEO CASSETTE RECORDER

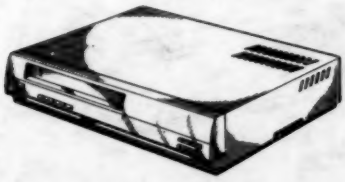
Jae J. Shim, Kyungki, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Dec. 14, 1988, Ser. No. 284,466

Claims priority, application Rep. of Korea, Jun. 30, 1988, 9140/1988

Term of patent 14 years

U.S. Cl. D14—135



311,733

HOUSING FOR AN ELECTRICAL CONNECTOR

Katsutoshi Kuzuno; Shigeo Ishizuka; Hiroshi Watanabe, and Kazuaki Sakurai, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

Filed Feb. 10, 1988, Ser. No. 155,005

Claims priority, application Japan, Aug. 10, 1987, 62-32318

Term of patent 14 years

U.S. Cl. D13—133

311,734

PORTABLE TELEVISION SET

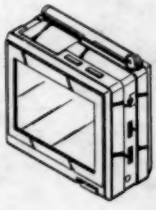
Asao Sasaki, Fussa, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Division of Ser. No. 231,541, Aug. 11, 1988. This application Feb. 8, 1990, Ser. No. 477,467

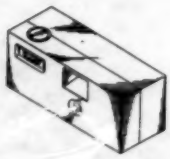
Claims priority, application Japan, May 6, 1988, 63-17979; May 6, 1988, 63-17978; May 10, 1988, 63-18383; May 10, 1988, 63-18382

Term of patent 14 years

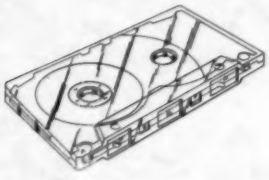
U.S. Cl. D14—126



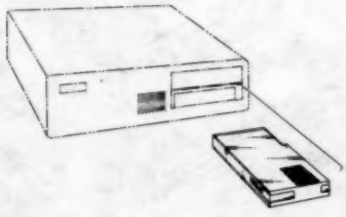
311,735
DISPOSABLE CAMERA
Takuya Arai, and Kimiaki Nakada, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Continuation of Ser. No. 947,961, Dec. 30, 1986. This application Feb. 13, 1987, Ser. No. 15,255
Claims priority, application Japan, Jun. 30, 1986, 61-25409; Aug. 13, 1986, 61-31758
Term of patent 14 years
U.S. Cl. D14—121



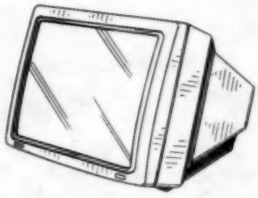
311,736
TAPE CASSETTE
David E. Perelli, Lawrenceville, N.J., assignor to Perelli Corporation, Lawrenceville, N.J.
Filed Jun. 16, 1987, Ser. No. 62,880
Term of patent 14 years
U.S. Cl. D14—121



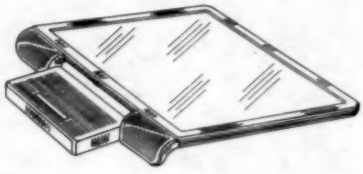
311,737
REMOVABLE HARD DISK DRIVE MODULE
Donald C. Westwood, Cupertino; Paul Bradley, Menlo Park; James G. Tappel, and Michael J. Nuttall, both of Palo Alto, all of Calif., assignors to Plus Development, Milipitas, Calif.
Filed Dec. 7, 1988, Ser. No. 280,997
Term of patent 14 years
U.S. Cl. D14—114



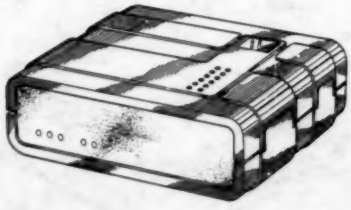
311,738
VIDEO DISPLAY TERMINAL
Christian C. Landry, Harvard; Bernard J. Maurer, Melrose, and Stanley J. Jaskiel, Salem, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Jun. 1, 1987, Ser. No. 57,816
Term of patent 14 years
U.S. Cl. D14—113



311,739
SHIELD FOR A VIDEO DISPLAY UNIT
Michele De Lucchi, Milan, Italy, assignor to Baltea S.p.A., Ivrea, Italy
Filed Aug. 30, 1988, Ser. No. 238,157
Claims priority, application Italy, Mar. 3, 1988, 52934-B/88
Term of patent 14 years
U.S. Cl. D14—114

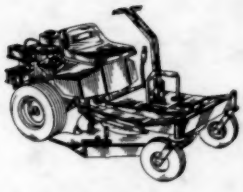


311,740
HOUSING FOR ELECTRONIC EQUIPMENT USED IN DATA COMMUNICATION
Eric Wagner, Brunbjörnsv. 47, S-722 Västerås, Sweden
Filed Jun. 15, 1987, Ser. No. 61,398
Claims priority, application Sweden, Dec. 15, 1986, 86-2970
Term of patent 14 years
U.S. Cl. D14—107

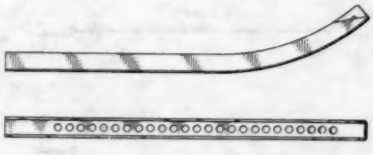


311,741
PORTABLE COMPUTER
Hiroaki Sakai, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan
Filed Jan. 9, 1989, Ser. No. 295,160
Claims priority, application Japan, Jul. 12, 1988, 63-27985
Term of patent 14 years
U.S. Cl. D14—106

311,742
RIDING LAWN MOWER
Clair D. Splittstoesser, Coffeyville, Kans., assignor to Dixon Industries, Inc., Coffeyville, Kans.
Filed Nov. 17, 1988, Ser. No. 272,3
Term of patent 14 years
U.S. Cl. D15—15

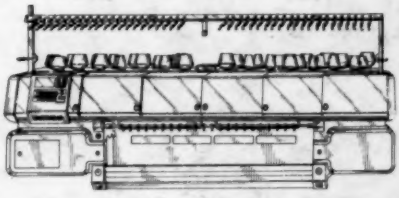


311,743
SAND DIVERTER BAR FOR USE ON AN EARTH MOVING VEHICLE, OR SIMILAR ARTICLE
Robert R. Pope, 13100 Skiomah Rd., Apple Valley, Calif. 92308
Continuation-in-part of Ser. No. 889,163, Jul. 25, 1986, abandoned. This application Oct. 22, 1987, Ser. No. 111,174
Term of patent 14 years
U.S. Cl. D15—28

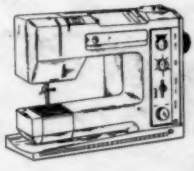


311,744
KNIFE FOR BEAN PULLERS OR THE LIKE
John J. Misico, 4370 Pike, Ubly, Mich. 48475
Filed Jul. 20, 1987, Ser. No. 75,314
Term of patent 14 years
U.S. Cl. D15—28

311,745
FLAT-BED KNITTING MACHINE
Rudolf Wieland, Filderstadt, Fed. Rep. of Germany, assignor to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany
Filed Sep. 9, 1987, Ser. No. 94,632
Term of patent 14 years
U.S. Cl. D15—66



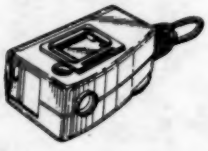
311,746
SEWING MACHINE
Roger Ramsey, Copley, Ohio, assignor to Fritz Gegauf Aktiengesellschaft Bernina-Nähmaschinenfabrik, Steckborn, Switzerland
Filed Jun. 26, 1986, Ser. No. 879,183
Term of patent 14 years
U.S. Cl. D15—69



311,747
CUTTING TOOL HOLDER
Wlajko Mihic, Tegnérvägen 9, Gävle S-802 28, Sweden
Filed Jul. 21, 1986, Ser. No. 888,189
Claims priority, application Sweden, Jan. 29, 1986, 86-0221
Term of patent 14 years
U.S. Cl. D15—140

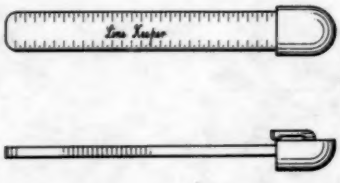
311,748
BINOCULARS
Jung I. Kwon, Seoul, Rep. of Korea, assignor to IMC International Ltd., Seoul, Rep. of Korea
Filed Nov. 16, 1988, Ser. No. 271,851
Term of patent 14 years
U.S. Cl. D16—133

311,749
CAMERA
Jimmy Y. Chan, Kowloon, Hong Kong, assignor to 501 Achiever Industries Limited, Kowloon, Hong Kong
Filed Sep. 14, 1987, Ser. No. 97,076
Claims priority, application United Kingdom, Mar. 25, 1987, 1041014
Term of patent 14 years
U.S. Cl. D16—218

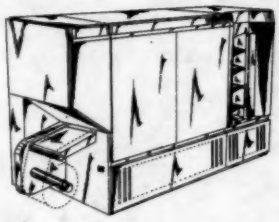


311,750
ELECTRIC GUITAR
Curt P. Roberts, 23600 Monument Canyon Dr., #G, Diamond Bar, Calif. 91765-2378
Filed Feb. 1, 1988, Ser. No. 150,714
Term of patent 14 years
U.S. Cl. D17—14

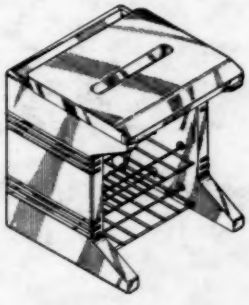
311,751
LINE GUIDE
Elizabeth M. Warrington, 13712 Mission Oaks Blvd., Seminole, Fla. 34646
Filed Aug. 16, 1989, Ser. No. 394,514
Term of patent 14 years
U.S. Cl. D19—34



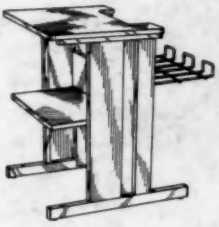
311,752
PRINTER CABINET OR SIMILAR ARTICLE
George R. Daniels, Glendale, Ariz.; Helmut H. Henneberg, Canton, and John F. Graham, Sudbury, both of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.
Filed Jul. 23, 1987, Ser. No. 77,536
Term of patent 14 years
U.S. Cl. D18—13



311,753
PRINTER STAND
Donald R. Westland, Venice, and H. Charles Hassel, Los Angeles, both of Calif., assignors to MicroComputer Accessories, Inc., Los Angeles, Calif.
Filed Sep. 6, 1988, Ser. No. 240,901
Term of patent 14 years
U.S. Cl. D18—23



311,754
PRINTER STAND
H. Charles Hassel, Los Angeles, and Donald Westland, Venice, both of Calif., assignors to MicroComputer Accessories, Inc., Los Angeles, Calif.
Filed Nov. 13, 1987, Ser. No. 119,990
Term of patent 14 years
U.S. Cl. D18—23



311,755
COMBINED SHEET FEEDER AND EDITING DEVICE FOR A COPYING MACHINE
Minoru Aoyama, Tokyo, and Tomohiko Hirata, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 21, 1988, Ser. No. 260,491
Claims priority, application Japan, Apr. 25, 1988, 63-17019
Term of patent 14 years
U.S. Cl. D18—42

311,756
BINDING STRIP
Charles T. Groswith, III, Los Altos, and Rickson Sun, Palo Alto, both of Calif., assignors to Taurus Holdings, Inc., Mountain View, Calif.
Filed Nov. 13, 1987, Ser. No. 121,762
Term of patent 14 years
U.S. Cl. D19—32

311,757

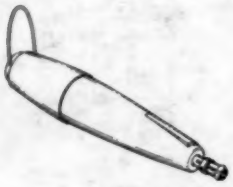
ELECTRICALLY-POWERED ERASER

Mack W. Crutchfield, Dallas, Tex., assignor to Rotex Company, Dallas, Tex.

Filed Jul. 27, 1987, Ser. No. 78,071

Term of patent 14 years

U.S. Cl. D19—53



311,758

GAME BOARD

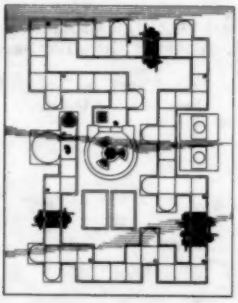
Gary D. Kotylak, 62 Galveston Ave., Sherwood Park, Alberta, T8A 2N6, Canada

Filed Oct. 15, 1987, Ser. No. 109,244

Claims priority, application Canada, May 14, 1987, 14-05-87-11

Term of patent 14 years

U.S. Cl. D21—25



311,759

TOY RATTLE

Harry S. Thomson, Richmond, and David Raffo, Hitchin, both of England, assignors to Monami Products Ltd., Surrey, England

Filed Feb. 9, 1988, Ser. No. 153,660

Claims priority, application United Kingdom, Aug. 13, 1987, 1044180

Term of patent 14 years

U.S. Cl. D21—65

311,760

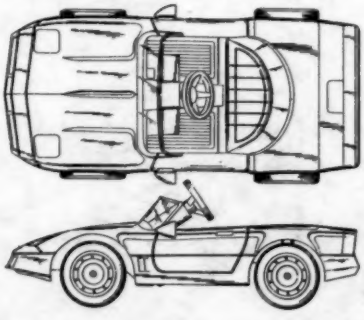
TOY VEHICLE

Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco, San Francisco, Calif.

Filed Jul. 26, 1988, Ser. No. 224,476

Term of patent 14 years

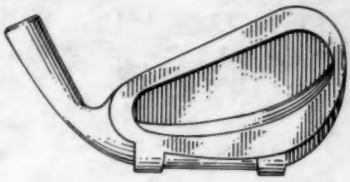
U.S. Cl. D21—78



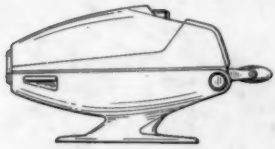
311,761
TOY TELEPHONE
Brian L. Aiken, West Hartford, and Bruce P. Popek, South Windsor, both of Conn., assignors to The Child Growth & Development Corporation, New York, N.Y.
Filed Mar. 21, 1988, Ser. No. 171,288
Term of patent 14 years
U.S. Cl. D21—111

311,762
RAG DOLL
Robert A. Chenevert, 33 Port Rd., South Portland, Me. 04106
Filed Jun. 16, 1988, Ser. No. 226,632
Term of patent 14 years
U.S. Cl. D21—166

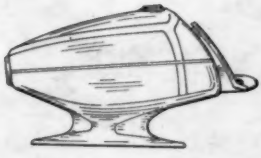
311,763
IRON GOLF CLUB HEAD
Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204
Filed Oct. 22, 1987, Ser. No. 111,164
Term of patent 14 years
U.S. Cl. D21—220



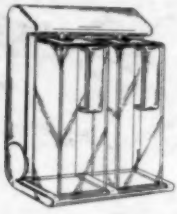
311,764
FISHING REEL
Robert J. Peterson, Claremore, Okla., assignor to Swede Industries, Inc., Claremore, Okla.
Filed Jul. 6, 1988, Ser. No. 215,924
Term of patent 14 years
U.S. Cl. D22—141



311,765
FISHING REEL
Robert J. Peterson, Claremore, Okla., assignor to Swede Industries, Inc., Claremore, Okla.
Filed Jul. 6, 1988, Ser. No. 215,925
Term of patent 14 years
U.S. Cl. D22—141

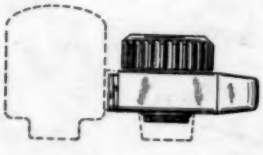


311,766
WALL MOUNTED WATER PURIFIER FOR HOME USE
Thomas Carrano, Fairfield, and Raymond Petrucci, Middlebury, both of Conn., assignors to Cuno, Incorporated, Meriden, Conn.
Filed Dec. 14, 1988, Ser. No. 284,457
Term of patent 14 years
U.S. Cl. D23—207



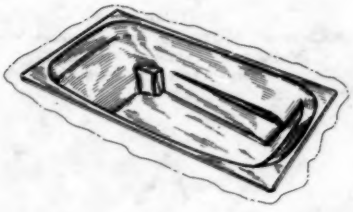
311,767
ENCLOSURE FOR A DRINKING WATER SYSTEM
Richard W. Beall, 229 4th Pl., Manhattan Beach, Calif. 90266
Filed Nov. 21, 1988, Ser. No. 273,496
Term of patent 14 years
U.S. Cl. D23—207

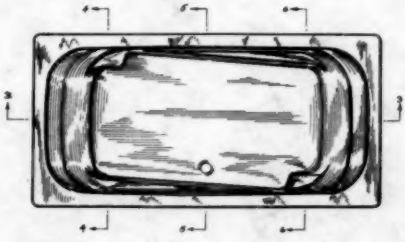
311,768
WATER FILTER VALVE
Keith F. Woodruff, Mountainside, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Filed Jun. 7, 1988, Ser. No. 203,217
Term of patent 14 years
U.S. Cl. D23—209



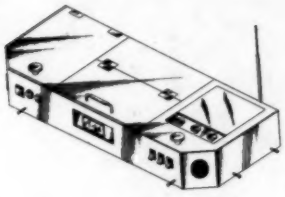
311,769
PEDESTRAL LAVATORY
Waldemar Nosari, Sao Paulo, Brazil, assignor to Celite S.A. Industria E Comercio, Sao Paulo, Brazil
Filed Nov. 30, 1988, Ser. No. 278,152
Claims priority, application Brazil, Jun. 3, 1988, 4800647
Term of patent 14 years
U.S. Cl. D23—292

311,770
BATHTUB OR THE LIKE
Bruce M. Sauter, Kohler, and Robert C. Giese, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1987, Ser. No. 2,255
Term of patent 14 years
U.S. Cl. D23—277





311,771
TOILET TANK TOP
Clarence E. Smith, 1372 E. 107th St., Los Angeles, Calif. 90002
Filed Feb. 5, 1988, Ser. No. 152,564
Term of patent 14 years
U.S. Cl. D23—313

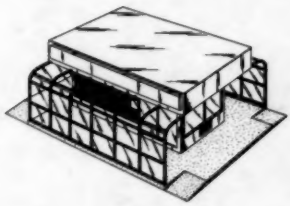


311,772
ELECTRIC FAN
Chi-Wing Yang, Hong Kong, Hong Kong, assignor to N.E. National Battery Factory (H.K.) Ltd., Kowloon, Hong Kong
Filed Dec. 30, 1988, Ser. No. 292,608
Term of patent 14 years
U.S. Cl. D23—378

311,773
CEILING FAN SHROUD
James R. Freeman, Rte. 3, Box 9, Jacksonville, Ark. 72076
Filed Jul. 27, 1987, Ser. No. 78,271
Term of patent 14 years
U.S. Cl. D23—411

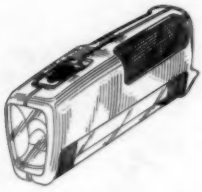
311,774
COMBINED MEDICINAL CONTAINER AND DISPENSER
Milton J. Lax, Fort Myers Beach, Fla., assignor to Milrob Corporation, Aurora, Ohio
Filed Jan. 21, 1987, Ser. No. 5,734
Term of patent 14 years
U.S. Cl. D24—34

311,775
VIDEO CASSETTE VENDING MACHINE CENTER
Harold E. Brown, Pasadena, Calif., assignor to Video International Vending Associates, Inc., West Covina, Calif.
Filed Jul. 27, 1988, Ser. No. 224,892
Term of patent 14 years
U.S. Cl. D25—33

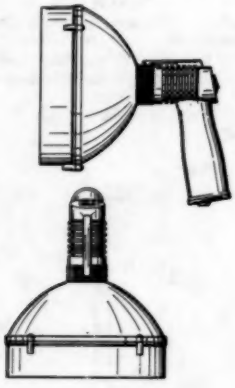


311,776
TORCH
Leonardus A. C. Krol, Gorinchem, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 3, 1988, Ser. No. 254,009
Claims priority, application United Kingdom, Apr. 13, 1988, 1049930
Term of patent 14 years
U.S. Cl. D26—42

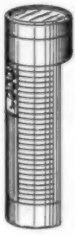
311,777
COMBINED FLASHLIGHT AND FLUORESCENT LANTERN
David K. Stearns, Derby, Kans., assignor to Coleman Outdoor Products, Inc., Wichita, Kans.
Filed Apr. 28, 1988, Ser. No. 187,393
Term of patent 14 years
U.S. Cl. D26—42



311,778
SUPERLIGHT
Raymond L. Dennis, 16 E. Terrace, Cleve., South Australia, Australia (5640)
Filed Jun. 8, 1987, Ser. No. 59,279
Term of patent 14 years
U.S. Cl. D26—45

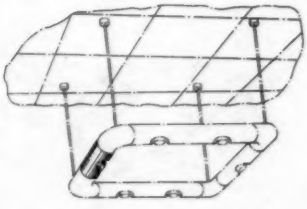


311,779
TORCH
Leonardus A. C. Krol, Gorinchem, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 3, 1988, Ser. No. 254,010
Claims priority, application United Kingdom, Apr. 13, 1988, 1049927
Term of patent 14 years
U.S. Cl. D26—46



311,780
POCKET FLASHLIGHT
Ferrion Urquhart, 7822 S. Colfax, Chicago, Ill. 60649
Filed May 31, 1988, Ser. No. 199,596
Term of patent 14 years
U.S. Cl. D26—46

311,781
ADJUSTABLE LIGHTING FIXTURE
Scott D. Usher, 98 Copley Ave., Teaneck, N.J. 07666
Filed May 1, 1987, Ser. No. 45,670
Term of patent 14 years
U.S. Cl. D26—65



311,782

DISPOSABLE FACESHIELD

Arthur J. Salce, and Richard T. Metcalfe, both of Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 152,920, Feb. 5, 1988. This application Jun. 14, 1988, Ser. No. 206,681

Term of patent 14 years

U.S. Cl. D28—9

311,783

HOUSING FOR HAIR DRYER

James M. Howard, Denville, N.J., assignor to Conair Corporation, Stamford, Conn.

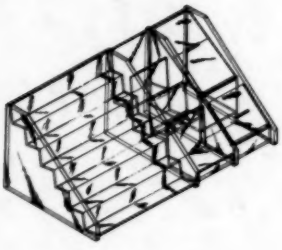
Filed Apr. 9, 1990, Ser. No. 506,020

Term of patent 14 years

U.S. Cl. D28—18

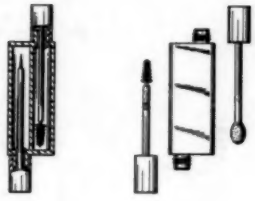
311,784
RAZOR HANDLE
Michael Schwartz, Herne, Fed. Rep. of Germany, assignor to Wilkinson Sword GmbH, Fed. Rep. of Germany
Filed Jul. 28, 1988, Ser. No. 225,137
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 29066
Term of patent 14 years
U.S. Cl. D28—48

311,785
MANICURIST STAND
Lawrence D. Gaynor, 7139 Hillside Dr., West Bloomfield, Mich. 48322
Filed Oct. 12, 1988, Ser. No. 256,922
Term of patent 14 years
U.S. Cl. D28—61



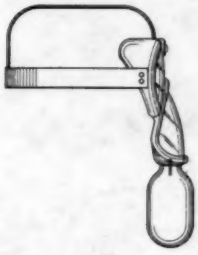
311,786
PERFUME ATOMIZER
Isabelle Cánovas, 39, rue de l'Université , 75007 Paris, France
Filed Aug. 23, 1988, Ser. No. 235,189
Term of patent 14 years
U.S. Cl. D28—91.1

311,787
COMBINED CONTAINER/BOTTLE AND COSMETIC WAND APPLICATORS OR THE LIKE
Henry J. Cassai, 163-47 85th St., Howard Beach, N.Y. 11414, and Gino H. Cassai, Brooklyn, N.Y., assignors to Henry J. Cassai, Howard Beach, N.Y.
Division of Ser. No. 736,448, May 21, 1985. This application Mar. 28, 1989, Ser. No. 329,497
Term of patent 14 years
U.S. Cl. D28—77



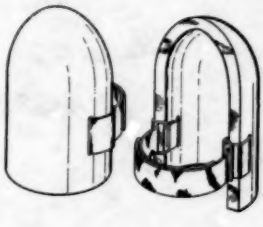
311,788
VALVE FOR SCUBA EQUIPMENT OR THE LIKE
Joseph C. Trinkwalder, Jr., North Tonawanda, N.Y., assignor to Harsco Corp., Wormleysburg, Pa.
Filed May 11, 1988, Ser. No. 193,488
Term of patent 14 years
U.S. Cl. D29—6

311,789
PROTECTIVE MASK
Richard Villarreal, and Yvonne A. Villarreal, both of 2926 S. Mabbett Ave., Milwaukee, Wis. 53207
Filed Sep. 2, 1988, Ser. No. 240,042
Term of patent 14 years
U.S. Cl. D29—9

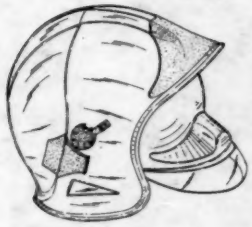


311,790
ELBOW SHOCK ABSORBER
Jean-Michel Krief, Vancouver, Canada, assignor to Vancouver Projects International, Inc., Vancouver, Canada
Filed Oct. 25, 1988, Ser. No. 262,008
Term of patent 14 years
U.S. Cl. D29—20

311,791
KNEE PAD
Eleanor Koldofsky, Willowdale, and Jacqueline Hall, Etobicoke, both of Canada, assignors to Happiness Inc., Ontario, Canada
Filed Oct. 1, 1987, Ser. No. 103,913
Claims priority, application Canada, Aug. 19, 1987, 19-08-87-7
Term of patent 14 years
U.S. Cl. D29—10

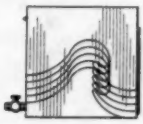


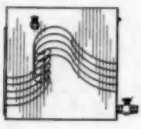
311,792
HELMET
Adrien Gallet, Chatillon Sur Chalaronne, France, assignor to Gallet S.A., Chatillon Sur Chalaronne, France
Filed Mar. 24, 1987, Ser. No. 30,268
Claims priority, application France, Jan. 12, 1987, 870,086
Term of patent 14 years
U.S. Cl. D29—14



311,793
HORSESHOE FOR HIND HOOF
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051
Filed Jun. 8, 1988, Ser. No. 203,872
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D30—148

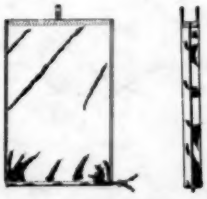
311,794
PET BATH WITH SHOWER
Gary A. Barone, 4616 Surrey Rd., Harrisburg, Pa. 17109
Filed Oct. 26, 1987, Ser. No. 112,762
Term of patent 14 years
U.S. Cl. D30—158



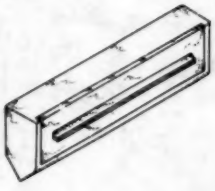


311,795
DISPOSABLE PET LITTER HOUSING
Susan N. Mannschreck, Rte. 4, Box 100, Atoka, Okla. 74525
Continuation-in-part of Ser. No. 379,159, Jul. 12, 1989. This application Nov. 21, 1989, Ser. No. 439,927
Term of patent 14 years
U.S. Cl. D30—161

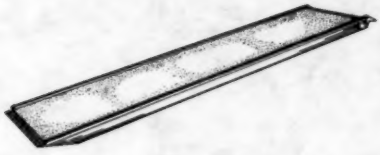
311,796
RECLOSABLE DEBRIS BAG FOR POOL CLEANERS
Christopher G. Collins, 13946 Dawson St., Garden Grove, Calif. 92643
Filed Apr. 24, 1987, Ser. No. 42,009
Term of patent 14 years
U.S. Cl. D32—31

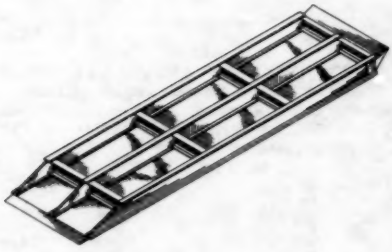


311,797
VACUUM CLEANER SQUEEGEE ATTACHMENT
David R. Hult, and Mark J. Tomasiak, both of St. Charles County, Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed Jul. 25, 1988, Ser. No. 223,928
Term of patent 14 years
U.S. Cl. D32—32

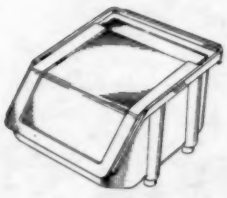


311,798
LOADING RAMP
Steven L. Boots, Spokane; Oscar H. Williams, Jr., Newport, and Barry S. Wallwork, Spokane, all of Wash., assignors to Stinson Manufacturing Co., Inc., Spokane, Wash.
Filed Dec. 9, 1987, Ser. No. 130,672
Term of patent 14 years
U.S. Cl. D34—32

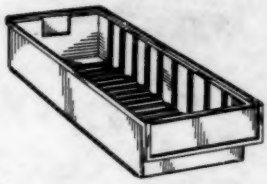




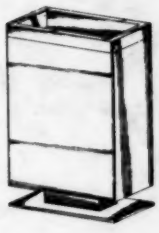
311,799
PARTS BIN
Donald Embree, Copley, and David L. Hamann, Cincinnati, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 1, 1988, Ser. No. 226,974
Term of patent 14 years
U.S. Cl. D34—40



311,800
STORAGE BOX
Heikki Kiiski, Turku, Finland, assignor to Treston Oy, Turku, Finland
Filed Dec. 12, 1988, Ser. No. 283,523
Claims priority, application Finland, Sep. 23, 1988, 761/88; Sep. 23, 1988, 762/88
Term of patent 14 years
U.S. Cl. D34—40

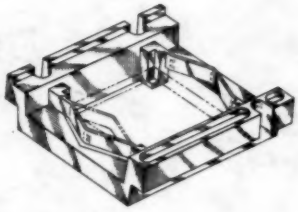


311,801
WASTE RECEPTACLE
Gunnar Kullenberg, 2016 Euclid St., Apt. 9, Santa Monica, Calif. 90405-1545
Filed Oct. 11, 1988, Ser. No. 255,417
Term of patent 14 years
U.S. Cl. D34—5

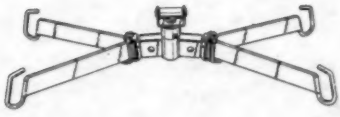


311,802
SERVICE CART
Eugene Getto, New York, N.Y., assignor to Itemakers, Ltd., Forest Hills, N.Y.
Filed Feb. 2, 1988, Ser. No. 151,260
Term of patent 14 years
U.S. Cl. D34—21

311,803
PALLET
Robert H. Murphy, Merrimack, and Roland Gosselin, Nashua, both of N.H., assignors to R.H. Murphy Co., Amherst, N.H.
Filed Jan. 15, 1988, Ser. No. 144,388
Term of patent 14 years
U.S. Cl. D34—38



311,804
SLING FOR LIFTING A DISABLE PERSON
Rolf Eliasson, Vilhelmina, Sweden, assignor to Landstingens Inkopscentral, LIC, Ekonomisk Forening, Solna, Sweden
Filed Nov. 5, 1987, Ser. No. 117,146
Claims priority, application Sweden, May 14, 1987, 87-1097
Term of patent 14 years
U.S. Cl. D34—28



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 30TH DAY OF OCTOBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See*—
Lo, Young S.; Shamblee, Dwight A.; Causey, David H.; and Mays, Richard P., 4,966,979, Cl. 548-950.000.

ABB Stal AB: *See*—
Hartevelt, Peter D., 4,965,996, Cl. 60-39.464.

Abbott Laboratories: *See*—
Manes, Michael R., 4,967,159, Cl. 324-650.000.

Abel Pumpen GmbH & Co. KG: *See*—
Henkel, Wolfgang E.; Stapelfeldt, Volker; and Belling, Dietrich, 4,966,528, Cl. 417-63.000.

Abood, Leo G. Agonists and antagonists to nicotine as smoking deterrents. 4,966,916, Cl. 514-534.000.

AC Biotechnics AB: *See*—
Sarner, Erik, 4,966,704, Cl. 210-603.000.

AC Greiff Ytbehandling AB: *See*—
Loof, Ingemar, 4,966,330, Cl. 239-690.000.

Accattato, Carlo. Device for cleaning and polishing jewelry. 4,966,673, Cl. 204-224.00M.

Acker, Michael: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

Ackerman, Marvin: *See*—
Lipton, Lenny; and Ackerman, Marvin, 4,967,268, Cl. 358-92.000.

Ackmann, Stephen A.; Beck, James R.; and Wright, Fred L. Use of gametocidal pyrazoles to produce hybrid seed. 4,966,623, Cl. 71-92.000.

Acustar, Inc.: *See*—
Betterton, Joseph T.; McKee, Thomas S.; and Glover, Alfred H., 4,967,047, Cl. 200-83.00J.

Adachi, Kazuyoshi: *See*—
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, 4,967,299, Cl. 360-121.000.

Adam, Yossi: *See*—
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, 4,966,824, Cl. 430-115.000.

Adams, Phillip A. Workpiece joint-forming template system. 4,965,943, Cl. 33-758.000.

Adams, Tello: *See*—
Cooper, Jonni; and Adams, Tello, 4,966,154, Cl. 128-671.000.

Adey, Walter H., to Ecological Systems Technology, L.P. Water purification system and apparatus. 4,966,096, Cl. 119-3.000.

Advanced Cardiovascular Systems, Inc.: *See*—
Kraus, Jeffrey L.; and Guthrie, Linda T., 4,966,163, Cl. 128-772.000.

Advanced Golf Concepts, Inc.: *See*—
Cohen, Wilburt, 4,967,062, Cl. 219-521.000.

Advanced Micro Devices, Inc.: *See*—
Freidin, Philip, 4,967,346, Cl. 364-200.000.

AECI Limited: *See*—
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., 4,966,077, Cl. 102-313.000.

Aerospace Corporation, The: *See*—
Wang, Charles C. P.; and Smith, Patrick L., 4,967,063, Cl. 250-201.100.

Aerospatiale Societe Nationale Industrielle: *See*—
Bonafe, Jean L., 4,967,363, Cl. 364-427.000.

Aertken, Karl: *See*—
Westernacher, Helmut; Aertken, Karl; and Stieren, Thomas, 4,967,019, Cl. 568-873.000.

Agajanian's Ascot Slic Trac, Inc.: *See*—
Sobodos, David W.; and Chalmers, David W., 4,966,391, Cl. 280-777.000.

Agence Regionale de Developpements Technologiques: *See*—
Prunier, Robert; Ruiz, Regis L.; and Ravier, J. Pierre, 4,966,023, Cl. 72-41.000.

Agence Spatiale Europeenne: *See*—
Ockels, Wubbo, 4,965,886, Cl. 2-2.10A.

Agency of Industrial Science and Technology: *See*—
Ibusuki, Takashi; Nakamura, Keigo; and Kutsuna, Schuzou, 4,966,665, Cl. 204-157.300.
Kikumoto, Makoto; Moroto, Masakazu; and Osumi, Masato, 4,966,145, Cl. 128-377.000.

Agfa-Gevaert AG: *See*—
Nitsch, Wilhelm, 4,967,222, Cl. 354-321.000.

Agfa-Gevaert, N.V.: *See*—
De Prijcker, Jozef P.; Zwijnen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 4,967,221, Cl. 354-318.000.

Agostinacci, Frank J. Combination marker and tape measure. 4,965,941, Cl. 33-668.000.

Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, to Mitsui Petrochemical Industries, Ltd. Reflection-preventive pellicle film. 4,966,813, Cl. 428-421.000.

Agranoff, Bernard W.: *See*—
Rich, Arthur; Conti, Ralph S.; and Agranoff, Bernard W., 4,967,084, Cl. 250-361.00R.

Agro-Kanesho Company, Ltd.: *See*—
Onodera, Nobuo; Nanjo, Katsumi; Kariya, Akinori; and Kanase, Kiyoshi, 4,966,896, Cl. 514-469.000.

Aharon, Roni, to F.I.A. Futurologie Industrielle Automation GmbH. Laser system. 4,967,053, Cl. 219-121.780.

Ahsan, M. Quamrul; Griffiths, Andrew; Haug, Ernest; and Norcross, Roy, to Degussa Aktiengesellschaft. Process for the removal of cyanide from wastewaters. 4,966,715, Cl. 210-721.000.

Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, to Leybold Aktiengesellschaft. Cathode sputtering apparatus on the magnetron principle with a hollow cathode and a cylindrical target. 4,966,677, Cl. 204-298.210.

Aichi Steel Works, Limited: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

Aikawa, Norihiro, to Kubota, Ltd. Combination backhoe vehicle and bulldozer apparatus. 4,966,240, Cl. 172-825.000.

Air Products and Chemicals, Inc.: *See*—
Carr, Richard V. C., 4,967,006, Cl. 564-490.000.
Fowlkes, Robert L., 4,967,001, Cl. 564-305.000.
Howard, Richard E.; and Keene, Joseph P., 4,966,207, Cl. 141-98.000.

Aisan Kogyo Kabushiki Kaisha: *See*—
Itoh, Hideki; and Takeuchi, Hitoshi, 4,966,120, Cl. 123-516.000.

Aisin Aw Co., Ltd.: *See*—
Hayakawa, Youichi; Hosono, Chihiro; Nishida, Masaaki; and Kato, Kozo, 4,966,264, Cl. 192-3.340.

Aita, Shuichi: *See*—
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Aizawa, Kaoru: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, 4,966,281, Cl. 206-330.000.
Kawanishi, Michirou; Aizawa, Kaoru; and Kurono, Tatsuo, 4,966,282, Cl. 206-330.000.

Ajinomoto Company, Ltd.: *See*—
Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Kenichi, 4,966,994, Cl. 562-554.000.

Akagi, Shizuka, to Q. P. Corporation. Hydroponic culture system. 4,965,962, Cl. 47-65.000.

Akama, Hiroshi: *See*—
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, 4,966,882, Cl. 502-309.000.

Akamatsu, Norio; and Tsukao, Toshiya, to Sharp Kabushiki Kaisha; and Akamatsu, Norio. Load current control-type logic circuit. 4,967,105, Cl. 307-448.000.

Akashi, Akira, to Canon Kabushiki Kaisha. Camera incorporating automatic focusing apparatus. 4,967,225, Cl. 354-402.000.

Akatsu, Yohsuke: *See*—
Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, 4,967,360, Cl. 364-424.050.

Akazaki, Shuichi: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.

Aki, Seietsu; and Shinjo, Goro, to Sumitomo Chemical Company, Limited. Grains-storing bag. 4,966,796, Cl. 428-34.300.

Akitaya, Shinichi; Fukazawa, Toru; Nozokido, Yutaka; and Tabata, Nobuchika, to Chisso Corporation. Flame-retardant polypropylene resin composition. 4,966,931, Cl. 524-100.000.

Akiyama, Heiemon: *See*—
Masubuchi, Norio; and Akiyama, Heiemon, 4,965,985, Cl. 53-479.000.

Akselrud, Vitaly: *See*—
Brown, Paul; and Akselrud, Vitaly, 4,966,545, Cl. 425-557.000.

Akutagawa, Ichiro: *See*—
Kitagawa, Katugi; Akutagawa, Ichiro; and Ono, Kazuya, 4,966,928, Cl. 523-437.000.

Akutagawa, Satoshi, to Fujitsu Limited. Process for forming dicing lines on wafer. 4,967,229, Cl. 355-53.000.

Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, to Fuji Xerox Co., Ltd. Print storage medium. 4,967,206, Cl. 346-135.100.

Akzo Coatings, Inc.: *See*—
Godbey, E. Floyd, Jr.; Wolfe, Norman G.; and Zepka, David J., 4,966,948, Cl. 525-329.900.

Albert, Bernhard: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

Alberta Telecommunications Research Centre: *See*—
Grover, Wayne D., 4,967,411, Cl. 370-110.100.

Albertson, Douglas E.: *See*—
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 4,966,170, Cl. 131-88.000.

Albrecht, Konrad: *See*—
Heinrich, Rudolf; and Albrecht, Konrad, 4,966,621, Cl. 71-86.000.

Albright, Russell E.; and Green, Kenneth G. Desk and file drawer lock. 4,966,422, Cl. 312-218.000.

Alcon Laboratories, Inc.: *See*—
Gressel, Philip D.; Roehrs, Robert E.; Ubels, John L.; and Edelhauser, Henry F., 4,966,773, Cl. 424-489.000.

Aldrich, Wesley C., Jr. Web wrap detection system for an offset web printing press. 4,966,074, Cl. 101-177.000.

Aleshire, Rex A.: *See*—
Schuhmacher, Chris A.; and Aleshire, Rex A., 4,967,076, Cl. 250-236.000.

Alessi, Thomas R.: *See*—
Ellingboe, John W.; Bagli, Jehan F.; and Alessi, Thomas R., 4,966,975, Cl. 548-122.000.

Alewelt, Wolfgang: *See*—
Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, 4,966,958, Cl. 528-271.000.

Alexander, Paul R., Jr.: *See*—
Cussler, Edward L.; Callahan, Robert W.; and Alexander, Paul R., Jr., 4,966,707, Cl. 210-632.000.

Alfa-Laval Thermal AB: *See*—
Andersson, Jarl, 4,966,227, Cl. 165-167.000.

Alfred Fischbach KG: *See*—
Bruning, Werner, 4,966,468, Cl. 366-333.000.

Alfred Teves GmbH: *See*—
Schiel, Lothar; Jakobi, Ralf; and Bauer, Juergen, 4,966,420, Cl. 303-114.000.

Aligue, , to Mecanismos Auxiliares Industriales, S.A. System for fabrication of wire harness. 4,965,929, Cl. 29-742.000.

Allen, Roger E.: *See*—
Esterowitz, Leon; and Allen, Roger E., 4,967,416, Cl. 372-6.000.

Allergan, Inc.: *See*—
Crosson, Craig E.; Barton, Beverly E.; Garner, William H.; and Gwon, Arlene E., 4,966,577, Cl. 604-20.000.

Alliant Computer Systems Corporation: *See*—
Werner, Ross G.; and Ryherd, Eric L., 4,967,392, Cl. 364-900.000.

Allied-Signal Inc.: *See*—
Cowell, Wiley M.; Malmberg, Quentin C.; and Edgar, Jon M., 4,966,005, Cl. 62-79.000.
De Campos, Hugo N., 4,966,193, Cl. 137-625.350.
LaSalle, Jerry C.; Batra, Ravi; and Rorabaugh, Donald T., 4,966,750, Cl. 420-3.000.
Thomas, Rudy V.; and Towers, Kenneth S., 4,966,394, Cl. 280-807.000.

Allington, Robert W.; Tehrani, Aboighassem Y.; and Jones, John N., to Isco, Inc. Method of making a frit. 4,966,696, Cl. 210-198.200.

Alois Kober KG: *See*—
Werdich, Anton, 4,966,386, Cl. 280-700.000.

Alps Electric Co., Ltd.: *See*—
Bannai, Hiroyuki, 4,966,334, Cl. 242-85.000.
Okita, Masao; Omori, Shinichi; and Yunokuchi, Ryu, 4,967,297, Cl. 360-106.000.
Yoshioka, Kenji; and Ono, Yasuichi, 4,967,117, Cl. 313-506.000.

Althaus, Hans-Ludwig; and Greil, Andreas, to Siemens Aktiengesellschaft. Mounting for a substantially spherical lens in a metal tubule, and method for making such a mounting. 4,966,439, Cl. 350-253.000.

Altura Leiden Holding B.V.: *See*—
Baus, Heinz G., 4,965,894, Cl. 4-605.000.

Alvarez, Vernon L.: *See*—
Coughlin, Daniel J.; Belinka, Benjamin A.; and Alvarez, Vernon L., 4,966,999, Cl. 564-150.000.

ALZA Corporation: *See*—
Eckenhoff, James B., 4,966,767, Cl. 424-438.000.
Guittard, George V.; Wong, Patrick S. L.; Theeuwes, Felix; and Cortese, Richard, 4,966,769, Cl. 424-473.000.

Amana Refrigeration, Inc.: *See*—
Midlang, Brian M.; Kopf, Bruce A.; and Walker, Richard N., 4,966,004, Cl. 62-77.000.

Amdahl Corporation: *See*—
Zmyslowski, Allan J.; and Hom, Pat Y., 4,967,351, Cl. 364-200.000.

Amelio, Armand F.; and Fischer, William C., Jr., to United Technologies Corporation. Mechanically actuated slot for circulation control rotor. 4,966,526, Cl. 416-90.00R.

American Cyanamid Company: *See*—
Wang, Samuel S.; and Nagaraj, D. R., 4,966,938, Cl. 524-555.000.
Wasser, Richard B., 4,966,652, Cl. 162-135.000.

American Home Product: *See*—
Ellingboe, John W.; Bagli, Jehan F.; and Alessi, Thomas R., 4,966,975, Cl. 548-122.000.

American Home Products Corporation: *See*—
Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 4,966,905, Cl. 514-314.000.
Michelucci, John J.; Sherman, Deborah M.; and DeNeale, Richard J., 4,966,768, Cl. 424-468.000.

American National Can Company: *See*—
Genske, Roger P.; and Kim, Yong J., 4,966,795, Cl. 428-34.300.

Ames, John; Lang, David J.; and Walsh, Richard E., to Sundstrand Corporation. Involute cam actuator with piston drive. 4,966,067, Cl. 92-150.000.

Amgen: *See*—
Tallen, Michael J.; and Fenton, Dennis M., 4,966,844, Cl. 435-71.200.

Amiad U.S.A., Inc.: *See*—
Goodman, Geoffrey; Cagan, Uri; and Orlans, Yitzhak, 4,966,701, Cl. 210-419.000.

Amity Leather Products Co.: *See*—
Young, Raymond W., 4,966,260, Cl. 190-111.000.

Ammermann, Eberhard: *See*—
Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,967,003, Cl. 564-381.000.

Amon, Albert; Bleikolm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, to Sicpa Holding SA. Security document printing ink. 4,966,628, Cl. 106-30.000.

AMP Incorporated: *See*—
Barkus, Lee A.; Kandybowski, Steven J.; and Sinisi, David B., 4,966,557, Cl. 439-246.000.

Ancos Co., Ltd.: *See*—
Hashimoto, Yasuyuki; and Yamashita, Haruo, 4,966,483, Cl. 401-206.000.

Anderson, Derrick A. Saddle tree. 4,965,988, Cl. 54-44.000.

Anderson, Lawrence B.: *See*—
Schumacher, John C.; McMenamin, Joseph C.; Anderson, Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., 4,966,611, Cl. 55-20.000.

Anderson, Nils T.; and Katsen, Boris J., to James River Graphics, Inc. Composition for use in thermally sensitive coatings and a thermally sensitive recording material. 4,966,883, Cl. 503-208.000.

Anderson, Ray C. Unisex condom. 4,966,165, Cl. 128-830.000.

Andersson, Jarl, to Alfa-Laval Thermal AB. Plate evaporator. 4,966,227, Cl. 165-167.000.

Andreu, Enrique M.; Gomez, Fernando N.; Vallejo, Jose L. R.; and Ostariz, Jose L. S., to Cables de Comunicaciones, S.A. Aromatic thermotropic copolyesteramide. 4,966,956, Cl. 528-185.000.

Andrews, Mark J.: *See*—
Speller, Thomas H., Sr.; Davern, John W.; Weaver, Jeffrey P.; and Andrews, Mark J., 4,966,323, Cl. 227-51.000.

Andrieux, Raymond; Hom, Pierre; and Laseneur, Patrick, to Valeo. System for axially locating the rotor of a rotating machine. 4,967,111, Cl. 310-90.000.

Anello, Salvatore; and Turk, Nathan. Change return protection device. 4,966,325, Cl. 232-57.500.

Angelastro, Michael R.; and Blohm, Thomas R., to Merrell Dow Pharmaceuticals Inc. 4-substituted 17β-(cyclopropyloxy)androst-5-en-3β-ol and related compounds useful as C17-20 lyase inhibitors. 4,966,897, Cl. 514-177.000.

Angelastro, Michael R.; and Blohm, Thomas R., to Merrell Dow Pharmaceuticals Inc. 4-substituted 17β-(cyclopropylamino)androst-5-en-3β-ol and related compounds uscful as C_{17-20} lyase inhibitors. 4,966,898, Cl. 514-182.000.

Angiogenics, Ltd.: *See*—
Gillespie, Larrian, 4,966,890, Cl. 514-25.000.

Ankenbauer, Gerhard; Bayer, Oswald; De Boer, Jan; and Rasp, Thomas, to FAG Kugelfischer Georg Schafer (KGaA). Bearing support with additional axially resilient ring. 4,966,475, Cl. 384-584.000.

Antenen, Dan E. Gutter guard. 4,965,969, Cl. 52-12.000.

Antunez, Bruce A. Safety latch for a toilet tank valve. 4,965,891, Cl. 4-366.000.

Aoki, Shinobu: *See*—
Takaki, Usaji; Aoki, Shinobu; Yamamoto, Yoshihiro; and Hara, Isao, 4,966,977, Cl. 548-457.000.

Aoki, Tadamichi: *See*—
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.

Aoshima, Masashi: *See*—
Tsuji, Mitsuji; Usuda, Eiichi; and Aoshima, Masashi, 4,966,940, Cl. 525-66.000.

Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Electrical signal observing device for converting an electrical signal to be measured into an optical intensity waveform. 4,967,144, Cl. 324-96.000.

Aoyagi, Hikaru: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

Applied Magnetics Corporation: *See*—
Reid, James; Roberts, Gary E.; and Frank, Paul D., 4,967,300, Cl. 360-122.000.

APV Baker Pty Ltd: *See*—
Willett, Paul E., 4,966,071, Cl. 99-450.100.

Ara, Hirofumi: *See*—
Kohno, Satoshi; and Ara, Hirofumi, 4,966,261, Cl. 192-3.290.

Arai, Fuminori: *See*—
Tanaka, Mitsutoshi; Arai, Fuminori; Terashima, Kaoru; and Yaginuma, Nakatsugu, 4,966,784, Cl. 427-2.000.

Arai, Kiyotaka, to Mita Industrial Co., Ltd. Paper feed unit for image forming apparatuses. 4,956,359, Cl. 271-110.000.

Arai, Tatsuo: *See*—
Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, 4,966,500, Cl. 407-34.000.

Araki, Kyoichi: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, 4,966,281, Cl. 206-330.000.

Arambepola, Bernard, to General Electric Company, p.l.c., The. Processor for radar system. 4,967,200, Cl. 342-25.000.

Ariel, Joelle; and Legendre, Jacques, to Thomson-CSF. Microwave phase shifter circuit. 4,967,172, Cl. 333-161.000.

Arney, James R. Pet feeder and method for feeding. 4,966,099, Cl. 119-61.000.

Arreola, Miguel A.: *See*—
Higuera, Bernard A.; and Arreola, Miguel A., 4,966,423, Cl. 312-221.000.

Artunc, Hulusi; Egbers, Gerhard; Weinsdorfer, Helmut; and Wolfrum, Jurgen, to Deutsche Institute fur Textil- und Faserforschung Stuttgart Stiftung des Offentlichenrechts. Means for the interlacing of yarn. 4,965,916, Cl. 28-271.000.

Artzer, Richard, to Pizza Stick-Ups Limited Partnership. Method of making a food product. 4,966,781, Cl. 426-280.000.

Aruga, Keiji; Mizoshita, Yoshifumi; Iwatsubo, Masshito; and Hatagami, Toshifumi, to Fujitsu Limited. Multi-positioner magnetic disk storage apparatus having means for reducing mechanical vibration interference between positioners. 4,967,293, Cl. 360-78.120.

Aruga, Tatsuo; and Iwasa, Yoshio, to Nissan Motor Co., Ltd. Camshaft driving arrangement for double overhead camshaft engine. 4,966,106, Cl. 123-90.310.

Asada, Kenichirou: *See*—
Yoshida, Yoshiki; Asada, Kenichirou; and Nagasawa, Kiyoto, 4,967,284, Cl. 358-300.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Masamoto, Junzo; Ohtake, Junzo; and Kawamura, Mamoru, 4,967,014, Cl. 568-458.000.
Ohzeki, Jurou, 4,966,814, Cl. 428-457.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Maruyama, Koichi, 4,966,449, Cl. 0350-454.000.
Morisawa, Tahei; and Mogamiya, Makoto, 4,967,219, Cl. 354-199.000.
Numako, Norio; and Kobayushi, Takeo, 4,967,218, Cl. 354-195.100.

Asakura, Hideo: *See*—
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,966,476, Cl. 400-208.000.

Asano, Hiroaki; Haga, Kyosuke; and Ito, Isao, to Toyoda Koki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Driving power transmission device. 4,966,268, Cl. 192-58.00C.

Asano, Kiyoji, to Green Corporation. Radio controlled two-wheeled vehicle toy. 4,966,569, Cl. 446-440.000.

Asano, Masamichi: *See*—
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,967,394, Cl. 365-201.000.

Aschberger, Matthias; Farber, Karlheinz; and Deininger, Anton, to Coca-Cola Co., The; and Bosch-Siemens Hausgerate GmbH. Apparatus for cooling the contents of a vessel. 4,966,232, Cl. 165-169.000.

Asea Brown Boveri Ltd.: *See*—
Bauer, Friedhelm; and Gruning, Horst, 4,967,255, Cl. 357-37.000.

Asea Brown Boveri Ltd: *See*—
Bauer, Friedheim, 4,967,244, Cl. 357-23.400.

Ashikaga, Tadashi; and Nomura, Masakatsu, to Kabushiki Kaisha Meidensha. Induction motor vector control. 4,967,135, Cl. 318-808.000.

Ashley, Carol S.; and Reed, Scott T., to United States of America, Energy. Sol-gel antireflective coating on plastics. 4,966,812, Cl. 428-412.000.

Ashworth, Roger P.: *See*—
Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., 4,967,199, Cl. 342-22.000.

Aspiri, Ray: *See*—
Cedergreen, Steven D.; Aspiri, Ray; Hunter, Kim R.; and Chiu, Butkui, 4,965,958, Cl. 43-55.000.

Associated Universities, Inc.: *See*—
Springston, Stephen R., 4,966,785, Cl. 427-39.000.

Astra-Vent AB: *See*—
Torok, Vilmos; and Loreth, Andrzej, 4,967,119, Cl. 315-111.910.

Astrand, Erik: *See*—
Johansson, Lasse; and Astrand, Erik, 4,966,616, Cl. 65-14.000.

Asulab S.A.: *See*—
Etienne, Jean-Daniel; Farine, Pierre-Andre ; and Bornoz, Claude, 4,966,150, Cl. 128-661.040.

AT&T Bell Laboratories: *See*—
Bacher, Edward V.; and Myer, Robert E., 4,967,168, Cl. 333-26.000.
Billingham, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovsky, Alexander, 4,965,932, Cl. 29-861.000.
Blonder, Greg E., 4,966,433, Cl. 350-96.170.
Hebard, Arthur F., 4,966,885, Cl. 505-1.000.
Heismann, Fred L., 4,966,431, Cl. 350-96.140.
Huang, Alan; and Jahns, Jurgen, 4,966,446, Cl. 350-417.000.
Huang Alan; and Jahns, Jurgen, 4,966,447, Cl. 350-417.000.
Lentine, Anthony L.; and Miller, David A. B., 4,967,068, Cl. 250-213.00A.
Shahid, Muhammed A., 4,966,645, Cl. 156-616.400.

Atlantic Richfield Company: *See*—
Blount, Curtis G.; and Bergren, Frank E., III, 4,966,233, Cl. 166-250.000.

Atochem: *See*—
Devic, Michel, 4,966,984, Cl. 552-208.000.

Atochem North America, Inc.: *See*—
Sullivan, Donald F., 4,966,827, Cl. 430-270.000.

Atsugi Motor Parts Company, Limited: *See*—
Kohno, Satoshi; and Ara, Hirofumi, 4,966,261, Cl. 192-3.290.

Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, to Mitsui Petrochemical Industries, Ltd. Curable compositions for dental drugs having sustained release property. 4,966,766, Cl. 424-422.000.

Audeh, Costandi A., to Mobil Oil Corporation. Process for the removal of mercury from natural gas condensate. 4,966,683, Cl. 208-251.00H.

Audeh, Costandi A., to Mobil Oil Corporation. Process for the removal of mercury from natural gas condensate. 4,966,684, Cl. 208-251.00H.

Ausimont S.p.A.: *See*—
Carmello, Diego; and Guglielmo, Giorgio, 4,967,023, Cl. 570-166.000.

Austgen Biojet Holdings Pty. Ltd.: *See*—
Jamieson, Donald F.; and Cardinal, Paul J., 4,966,705, Cl. 210-605.000.

Australian Mobile Tech Corporation Pty. Ltd.: *See*—
Featon, Robert J.; Fowler, James W.; and Miles, Barry J., 4,966,392, Cl. 280-801.000.

Aveda Corporation: *See*—
Purohit, Prakash C.; and Ramdeen, Lal G., 4,966,754, Cl. 424-195.100.

Avidan, Amos A.; and Yurchak, Sergei, to Mobil Oil Corporation. Integrated catalytic cracking process with light olefin upgrading. 4,966,680, Cl. 208-71.000.

Avni, Eitan; and Pace, Sal A., to Union Camp Corporation. Real time mottle measuring device and method. 4,966,455, Cl. 356-73.000.

Awano, Yuji, to 501 Fujitsu Limited. Compound semiconductor bipolar device with side wall contact. 4,967,252, Cl. 357-34.000.

AWD Technologies, Inc.: *See*—
Carberry, Terrance K., 4,966,654, Cl. 202-177.000.

Axis S.p.A.: *See*—
Santandrea, Luciano; and Lombardi, Massimo, 4,965,924, Cl. 29-596.000.

Axthammer, Ludwig, to Fichtel & Sachs AG. Shock absorbing or oscillation damper device. 4,966,257, Cl. 188-322.170.

Azizi, Sohiel. Mixing valve assembly for single-handle faucets. 4,966,191, Cl. 137-625.170.

Babcock-Bsh Aktiengesellschaft Vormals Buttner-Schilde-Haas AG: *See*—
Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, 4,966,739, Cl. 264-87.000.

Babcock-Hitachi Kabushiki Kaisha: *See*—
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, 4,966,882, Cl. 502-309.000.

Bacaner, Marvin B.; and Broadhurst, John H. Endotracheal tube and mass spectrometer. 4,966,141, Cl. 128-207.140.

Bacardit, Juan S., to Bendix Espana. Tandem rotary master cylinder. 4,965,999, Cl. 60-547.100.

Bacher, Edward V.; and Myer, Robert E., to AT&T Bell Laboratories. Coaxial-wave guide coupling assemblages. 4,967,168, Cl. 333-26.000.

Bachmann, Jean-Pierre; and Pesaro, Mario, to Givaudan Corporation. Flavor compositions and tobacco products containing 3,5,5,6,8,8-hexamethyl-1,2,3,4,5,6,7,8-octahydro-2-naphthalenone. 4,966,172, Cl. 131-276.000.

Backus, Richard J.: *See*—
Horton, Robert L.; and Backus, Richard J., 4,967,094, Cl. 250-561.000.

Badillo, Paul, to Bakron Corp. Composite rotary loop taker for lockstitch sewing machine. 4,966,088, Cl. 112-184.000.

Baer, Thomas R., to Newco of Janesville, Inc. Play structure hardware kit. 4,966,309, Cl. 272-85.000.

Bagli, Jehan F.: *See*—
Ellingboe, John W.; Bagli, Jehan F.; and Alessi, Thomas R., 4,966,975, Cl. 548-122.000.

Bahner, Friedrich: *See*—
Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, 4,966,739, Cl. 264-87.000.

Baier, Manfred; and Schafer, Roland, to Richard Wolf GmbH. Apparatus for the insufflation of gas into a body cavity. 4,966,578, Cl. 604-26.000.

Bailey, Fay W.: *See*—
Benham, Elizabeth; McDaniel, Max P.; and Bailey, Fay W., 4,966,951, Cl. 526-106.000.

Baillargeon, Bernard, to Les Entreprises Bernard Baillargeon Inc. All-terrain vehicle. 4,966,242, Cl. 180-9.440.

Baim, Donald S.: *See*—
Kuntz, Richard E.; and Baim, Donald S., 4,966,596, Cl. 606-7.000.

Baird, John S. Raising and lowering aid for trolling motors. 4,966,566, Cl. 440-6.000.

Baird, William C., Jr.; and Shoukry, Ehsan I., to Exxon Research & Engineering Company. Reforming with modified alumina catalysts. 4,966,682, Cl. 208-139.000.

Baird, William C., Jr., to Exxon Research & Engineering Company. Novel platinum agglomerated iridium catalysts. 4,966,878, Cl. 502-226.000.

Baird, William C., Jr., to Exxon Research & Engineering Company. Novel platinum-iridium reforming catalysts. 4,966,879, Cl. 502-226.000.

Baird, William C., Jr.; Riley, Kenneth L.; and Swan, George A., III, to Exxon Research & Engineering Company. Novel platinum-tin-alumina reforming catalysts. 4,966,880, Cl. 502-242.000.

Baird, William C., Jr., to Exxon Research & Engineering Company. Novel platinum-alumina reforming catalysts. 4,966,881, Cl. 502-252.000.

Bakron Corp.: *See*—
Badillo, Paul, 4,966,088, Cl. 112-184.000.

Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., to Bexel Corporation. Emergency umbrella. 4,966,179, Cl. 135-19.500.

Baldwin, W. Barton: *See*—
Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., 4,966,179, Cl. 135-19.500.

Baliga, Bantval J.; and Schlecht, Martin F., to General Electric Company. Power transistor structure with high speed integral antiparallel Schottky diode. 4,967,243, Cl. 357-23.400.

Ball Corporation: *See*—
Fithian, Michael J.; and Foster, James E., 4,967,258, Cl. 357-51.000.

Balog, Charles R.: *See*—
Seme, Joseph P., Jr.; Balog, Charles R.; and Janashak, Robert, 4,966,504, Cl. 409-140.000.

Baltimore Aircoil Company, Inc.: *See*—
Osborne, William T., 4,966,007, Cl. 62-101.000.

Ban, Kazuhiro; and Ojima, Atsuo, to Mitsubishi Danki Kabushiki Kaisha. Microwave integrated circuit. 4,967,171, Cl. 333-116.000.

Bandoh, Tadaaki: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.

Banfalvi, Zsofia: *See*—
Stacey, Gary; Nieuwkoop, Anthony J.; and Banfalvi, Zsofia, 4,966,847, Cl. 435-172.300.

Bania, Paul J.: *See*—
Wardlaw, Tommie L.; and Bania, Paul J., 4,966,816, Cl. 428-552.000.

Banks, Christopher P.; Irving, Edward; Renner, Alfred; and Smith, Terence J., to Ciba-Geigy Corporation. Polymerizable compositions. 4,966,923, Cl. 522-167.000.

Banks, Rodney H.: *See*—
Hoots, John E.; Banks, Rodney H.; and Johnson, Donald A., 4,966,711, Cl. 210-697.000.

Bankston, Clyde P.: *See*—
Bugga, Ratnakumar V.; DiStefano, Salvador; Williams, Roger M.; and Bankston, Clyde P., 4,966,823, Cl. 429-104.000.

Bannai, Hiroyuki, to Alps Electric Co., Ltd. Cable reel. 4,966,334, Cl. 242-85.000.

Bannochie, John G.; and Sherriff, Robert C., to MOLTECH Invent S. A. Cerium oxycompound, stable anode for molten salt electrowinning and method of production. 4,966,674, Cl. 204-290.00R.

Banyu Pharmaceutical Co., Ltd.: *See*—
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.

Barber, Donald T.: *See*—
Pfeffer, George; and Barber, Donald T., 4,966,639, Cl. 156-359.000.

Barber, Jeffrey R.; Breiten, Charles P.; Stanasolovich, David; and Theisen, Jacob F., to International Business Machines Corporation. Method for making borderless contacts. 4,966,870, Cl. 437-228.000.

Barclay, John A., to Lascon Lighting Industries (Proprietary) Limited. Pivotable luminaire. 4,967,324, Cl. 362-147.000.

Bares, Jan; and Tuhro, Richard H., to Xerox Corporation. Cleaning performance monitor. 4,967,238, Cl. 355-296.000.

Barish, Arnold E.; Kiesling, David A.; Mayo, Mark D.; and Svarczkopf, Walter A., to International Business Machines Corporation. Method and apparatus for detecting faults in differential current switching logic circuits. 4,967,151, Cl. 324-158.00T.

Barkus, Lee A.; Kandybowski, Steven J.; and Sinisi, David B., to AMP Incorporated. Electrical contact element. 4,966,557, Cl. 439-246.000.

Barnett, Larry R.; and Phillips, Robert M., to Star Microwave. Stripline traveling wave device and method. 4,967,162, Cl. 330-43.000.

Barney, William M., to Seislith Development, Inc. Method of acquiring and interpreting seismic data to obtain lithological parameters. 4,967,401, Cl. 367-46.000.

Barnthaler, Franz: *See*—
Zitz, Alfred; Barnthaler, Franz; and Brandl, Erich, 4,966,417, Cl. 299-33.000.

Barr-Nea, Liliane: *See*—
Rochkind, Simeone; Barr-Nea, Liliane; and Lubart, Rachel, 4,966,144, Cl. 128-395.000.

Barr, Phillip. Device for dispensation of compressed gas. 4,966,317, Cl. 222-5.000.

Bartlett, Allen J. Cryopump with multiple refrigerators. 4,966,016, Cl. 62-55.500.

Barton, Beverly E.: *See*—
Crosson, Craig E.; Barton, Beverly E.; Garner, William H.; and Gwon, Arlene E., 4,966,577, Cl. 604-20.000.

Barzynski, Helmut: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

BASF Aktiengesellschaft: *See*—
Boettcher, Andreas, 4,967,010, Cl. 568-315.000.
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.
Guenstner, Andreas; Mayer, Udo; and Oberlinner, Andreas, 4,966,983, Cl. 549-389.000.
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, 4,966,894, Cl. 514-56.000.
Hoercher, Ulrich; and Lechtken, Peter, 4,966,734, Cl. 260-420.000.
Karcher, Michael; Eckhardt, Heinz; and Henkelmann, Jochem, 4,967,015, Cl. 568-616.000.
Maier, Manfred; Mielke, Manfred; and Hauser, Peter, 4,966,331, Cl. 241-172.000.
Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,967,003, Cl. 564-381.000.
Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, 4,967,013, Cl. 568-433.000.

BASF Corporation: *See*—
Hazen, James L., 4,966,728, Cl. 252-354.000.
Kirk, Paula S., 4,966,779, Cl. 426-72.000.

Basquin, Serge: *See*—
Leverd, Elie; Bauer, Michel; and Basquin, Serge, 4,966,903, Cl. 514-283.000.

Basten, Mark J., to Lucas Industries public limited company. Internal combustion engine throttle control. 4,966,114, Cl. 123-396.000.

Bates, Norman R. Orthopedic support device. 4,966,136, Cl. 128-87.00R.

Batra, Ravi: *See*—
LaSalle, Jerry C.; Batra, Ravi; and Rorabaugh, Donald T., 4,966,750, Cl. 420-3.000.

Bauer, Friedheim, to Asea Brown Boveri Ltd. Power semiconductor component with switch-off facility. 4,967,244, Cl. 357-23.400.

Bauer, Friedhelm; and Gruning, Horst, to Asea Brown Boveri Ltd. Controllable power semiconductor component. 4,967,255, Cl. 357-37.000.

Bauer, Heinz, to Linde Aktiengesellschaft. Process for the separation of hydrocarbons. 4,966,612, Cl. 62-24.000.

Bauer, Juergen: *See*—
Schiel, Lothar; Jakobi, Ralf; and Bauer, Juergen, 4,966,420, Cl. 303-114.000.

Bauer, Michel: *See*—
Leverd, Elie; Bauer, Michel; and Basquin, Serge, 4,966,903, Cl. 514-283.000.

Baumann, Heinz; Mutter, Heinz; Schreiber, Kurt; and Thurig, Peter, to Sulzer Brothers Limited. Device for filling a gaseous fuel container. 4,966,206, Cl. 141-83.000.

Baumann, Todd D.: *See*—
Touchton, James J.; and Baumann, Todd D., 4,967,291, Cl. 360-78.040.

Baumgart, Rainer. Medical intromission kit. 4,966,587, Cl. 604-164.000.

Baumgarten, Gerd-Diethard, to Heinrich Baumgarten KG Spezialfabrik fuer Beschlagteile. Utensil having a detachable handle member. 4,965,907, Cl. 16-114.00A.

Baus, Heinz G., to Altura Leiden Holding B.V. Mixing device. 4,965,894, Cl. 4-605.000.

Baxter International Inc.: *See*—
Jacobs, Randall W.; and Peterson, Robert H., 4,966,167, Cl. 128-849.000.

Bayer Aktiengesellschaft: *See*—
Becker, Robert; Goldmann, Gerd; von Gizycki, Ulrich; and von Bonin, Wulf, 4,966,801, Cl. 428-113.000.
Klausener, Alexander; Paulus, Wilfried; Schmitt, Hans-Georg; and Brandes, Wilhelm, 4,966,974, Cl. 546-294.000.
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, 4,966,772, Cl. 424-482.000.
Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, 4,966,958, Cl. 528-271.000.
Westerhaus, Axel; Ganter, Karl-Werner; and Buxbaum, Gunter, 4,966,641, Cl. 106-456.000.

Bayer, Oswald: *See*—
Ankenbauer, Gerhard; Bayer, Oswald; De Boer, Jan; and Rasp, Thomas, 4,966,475, Cl. 384-584.000.

Bayless, Ronald E.; and Havard, James M. Snow melting heater mats. 4,967,057, Cl. 219-213.000.

Beaver, Richard P., to PPG Industries, Inc. Method of producing effective porous glass shapes. 4,966,613, Cl. 65-2.000.

Beck, James R.: *See*—
Ackmann, Stephen A.; Beck, James R.; and Wright, Fred L., 4,966,623, Cl. 71-92.000.

Beck, Rolf, to Kocher & Beck OHG Gravieranstalt und Rotationsstanzenbau. Method and apparatus for the manufacture of a punch having a sharp cutting edge. 4,966,054, Cl. 76-4.000.

Becker, Robert; Goldmann, Gerd; von Gizycki, Ulrich; and von Bonin, Wulf, to Bayer Aktiengesellschaft. Lightweight composite material. 4,966,801, Cl. 428-113.000.

Becton, Dickinson and Company: *See*—
Belt, William E., 4,966,758, Cl. 422-101.000.

Beebe, Kenneth W., to General Electric Company. Multiple venturi tube gas fuel injector for catalytic combustor. 4,966,001, Cl. 60-737.000.

Begel, Jacqueline: *See*—
Mouchart, Jacques; Begel, Jacqueline; and Duda, Eugene, 4,966,438, Cl. 350-173.000.

Belcher, Bryan L.; and Daniels, Michael P., to Rolls-Royce plc. Heat exchanger construction. 4,966,231, Cl. 165-166.000.

Belinka, Benjamin A.: *See*—
Coughlin, Daniel J.; Belinka, Benjamin A.; and Alvarez, Vernon L., 4,966,999, Cl. 564-150.000.

Bell, Howard F.; and Lane, Michael C. LED lamp with open encasement. 4,967,330, Cl. 362-311.000.

Belling, Dietrich: *See*—
Henkel, Wolfgang E.; Stapelfeldt, Volker; and Belling, Dietrich, 4,966,528, Cl. 417-63.000.

Beloit Corporation: *See*—
Frye, Kenneth G.; Fitzpatrick, Donald C.; and Grody, Donald R., 4,966,521, Cl. 414-788.800.

Belt, William E., to Becton, Dickinson and Company. Vacuum ampule filtration device. 4,966,758, Cl. 422-101.000.

Beltzer, Morton: *See*—
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; and Beltzer, Morton, 4,966,719, Cl. 252-42.700.

Bendix Espana: *See*—
Bacardit, Juan S., 4,965,999, Cl. 60-547.100.

Benham, Elizabeth; McDaniel, Max P.; and Bailey, Fay W., to Phillips Petroleum Company. High strength linear, low density polyethylene polymerization process. 4,966,951, Cl. 526-106.000.

Benishin, Christina G.: *See*—
Pang, Peter K. T.; Wang, Lawrence C. H.; Benishin, Christina G.; and Liu, Hsing J., 4,966,893, Cl. 514-54.000.

Benjamin, Earl J.; Ke, Charles H.; Hynson, Richard B.; and Hsu, Chi Ming L., to Kraft General Foods, Inc. Method for producing frozen proofed dough. 4,966,778, Cl. 426-19.000.

Bentley, Robert L.: *See*—
Gainer, James; and Bentley, Robert L., 4,966,920, Cl. 521-99.000.

Bents, Terry, to Iowa Industrial Hydraulics, Inc. Tie bolt accumulator with safety valve. 4,966,200, Cl. 138-31.000.

Bentz, Joseph C.; Yonushonis, Thomas M.; Patten, James W.; and Fujimoto, Yuji, to Cummins Engine Company, Inc. Sintered ceramic ball and socket joint assembly. 4,966,108, Cl. 123-90.510.

Beraldin, J. Angelo; and Blais, Francois, to National Research Council Canada/Conseil National de Recherches Canada. Method and system for increasing the effective dynamic range of a photosensor. 4,967,066, Cl. 250-205.000.

Berg, Lloyd, to Berg, Lloyd. Separation of styrene from ethyl benzene or o-xylene by azeotropic or extractive distillation with esters. 4,966,656, Cl. 203-060.000.

Berg, Lloyd, to Berg, Lloyd. Recovery of ethylene glycol from butanediol isomers by azeotropic distillation. 4,966,658, Cl. 203-62.000.

Berg, William E.; and Lueker, Jonathan C., to Tektronix, Inc. Inductor and carrier suitable for attaching to a hybrid substrate or the like. 4,967,175, Cl. 336-65.000.

Berger, Frederick; and Berger, Mindy S. Foldable diaper-changing table. 4,965,896, Cl. 5-424.000.

Berger, Josef; Neukermans, Armand P.; and Vaught, John L., to Tencor Instruments. Method and apparatus for detecting and sizing particles on surfaces. 4,967,095, Cl. 250-572.000.

Berger, Mindy S.: *See*—
Berger, Frederick; and Berger, Mindy S., 4,965,896, Cl. 5-424.000.

Bergfried, Dietrich: *See*—
Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krapp, Michael, 4,967,316, Cl. 361-424.000.

Bergman, Mady I. Luggage container with pull handle. 4,966,259, Cl. 190-18.00A.

Bergren, Frank E., III: *See*—
Blount, Curtis G.; and Bergren, Frank E., III, 4,966,233, Cl. 166-250.000.

Berkel & Company Contractors, Inc.: *See*—
Blum, Kenneth J., 4,966,498, Cl. 405-233.000.

Berlex Laboratories, Inc.: *See*—
Lumma, William C., Jr.; and Phillips, Gary B., 4,966,967, Cl. 540-568.000.

Berner, Gianni, to Contraves AG. Electronic circuit and method of production thereof. 4,967,313, Cl. 361-400.000.

Bernhein, Michael: *See*—
Singer, Heinrich; Stechele, Werner; and Bernhein, Michael. 4,966,725, Cl. 252-8.800.

Bersier, Nicolas, to Etablissement Nanicoba. Prop. 4,966,345, Cl. 248-354.300.

Berta, Norbert L, to McNeilab, Inc. Gelatin coated caplets and process for making same. 4,966,771, Cl. 424-478.000.

Bervig, Dale R.: *See*—
Raney, Ty A.; and Bervig, Dale R., 4,967,055, Cl. 219-121.500.

Bessinger, Walter L.; Stumpf, William E.; and Carlson, Casey L., to Knape & Vogt Manufacturing Company. Aesthetic shelving system. 4,966,343, Cl. 248-243.000.

Bessler, Warren F.: *See*—
Jaster, Heinz; and Bessler, Warren F., 4,966,010, Cl. 62-179.000.

Besso, Erica M.: *See*—
Sipos, Peter A.; and Besso, Erica M., 4,966,960, Cl. 528-335.000.

Beth Israel Hospital Association, The: *See*—
Kuntz, Richard E.; and Baim, Donald S., 4,966,596, Cl. 606-7.000.

Bethel, Bob J. Cam action fishing sinker device. 4,965,956, Cl. 43-43.100.

Betterton, Joseph T.; McKee, Thomas S.; and Glover, Alfred H., to Acustar, Inc. Switch with post-assembly calibration access. 4,967,047, Cl. 200-83.00J.

Betti, Giorgio; Zuffada, Maurizio; Sacchi, Fabrizio; and Gornati, Silvano, to SGS-Thomson Microelectronics S.r.l. Temperature-independent variable-current source. 4,967,139, Cl. 323-312.000.

Betush, Frank A. Vacuum evacuator for dental debris. 4,966,551, Cl. 433-95.000.

Betz Laboratories: *See*—
Donofrio, Deborah K.; and Whitekettle, Wilson K., 4,966,775, Cl. 424-661.000.

Bexel Corporation: *See*—
Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., 4,966,179, Cl. 135-19.500.

Beyerle, Rudi: *See*—
Zoller, Gerhard; Beyerle, Rudi; and Schindler, Ursula, 4,966,901, Cl. 514-211.000.

BH-F (Triplex) Inc.: *See*—
Smith, Steven E.; and Murphy, Kenneth J., 4,967,347, Cl. 364-200.000.

Bhawal, Baburao M.: *See*—
Deshmukh, Abdul R. A. S.; Bhawal, Baburao M.; Shiralkar, Vasudeo P.; and Rajappa, Srinivasachari, 4,967,007, Cl. 564-501.000.

BICC Public Limited Company: *See*—
Mohan, Navaratnam C.; and Poole, Michael J., 4,967,039, Cl. 174-25.00C.

Bielawski, Billey J., Sr.: *See*—
Riera, John F.; Bielawski, Billey J., Sr.; and Pavelec, John J., 4,966,061, Cl. 83-862.000.

Bigge Crane & Rigging Co.: *See*—
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 4,965,922, Cl. 29-426.400.

Billinghain, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovaky, Alexander, to AT&T Bell Laboratories. Method and apparatus for attaching a connector. 4,965,932, Cl. 29-861.000.

Biomaterials Universe, Inc.: *See*—
Hyon, Suong-Hyu; and Ikada, Yoshito, 4,966,924, Cl. 523-106.000.

Birck, Jonathan D.; and Garuts, Valdis E., to Virtual Corporation. Acoustic admittance measuring apparatus with wide dynamic range and logarithmic output. 4,966,160, Cl. 128-746.000.

Bisagni, Emile R. B.; and Greletepouse Rautureau, Marilys, to Centre National de la Recherche Scientifique (C.N.R.S.). Method for preparing 1-chloro-5-alkylisoquinolines condensed with aromatic groups. 4,966,971, Cl. 546-64.000.

Bisch, Christoher G., to Kitchener Forging Ltd. Modular bridge. 4,965,903, Cl. 14-1.000.

Bishai, Macram N., to McCord Winn Textron. Pumping system for the back support of a seat. 4,966,410, Cl. 297-284.000.

Bishop, M. D., to Phillips Petroleum Company. Ore flotation employing amino mercaptothiadiazoles. 4,966,688, Cl. 209-167.000.

Bittenbring, Gerhard: *See*—
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittenbring, Gerhard, 4,966,269, Cl. 192-70.160.

Blackbourn Inc: *See*—
Sykes, Philip K.; and Schmitz, Stephen R., 4,966,283, Cl. 206-387.000.

Blackwell, Gordon B.: *See*—
Huang, Chin-Teh; and Blackwell, Gordon B., 4,966,934, Cl. 524-315.000.

Blais, Francois: *See*—
Beraldin, J. Angelo; and Blais, Francois, 4,967,066, Cl. 250-205.000.

Blankenship, Allen J.: *See*—
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,966,947, Cl. 525-327.600.

Bleikolm, Anton: *See*—
Amon, Albert; Bleikolm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, 4,966,628, Cl. 106-30.000.

Blendinger, Gunter: *See*—
Gang, Achim; Schraag, Martin; and Blendinger, Gunter, 4,966,152, Cl. 128-661.070.

Blohm, Thomas R.: *See*—
Angelastro, Michael R.; and Blohm, Thomas R., 4,966,897, Cl. 514-177.000.
Angelastro, Michael R.; and Blohm, Thomas R., 4,966,898, Cl. 514-182.000.

Blomberg Robotertechnik GmbH: *See*—
Hans, Richter, 4,965,939, Cl. 33-558.000.

Blonder, Greg E., to AT&T Bell Laboratories. Device including a component in alignment with a substrate-supported waveguide. 4,966,433, Cl. 350-96.170.

Bloom, Mitchell: *See*—
DeSantis, Eugene; and Bloom, Mitchell, 4,966,320, Cl. 224-229.000.

Blount, Curtis G.; and Bergren, Frank E., III, to Atlantic Richfield Company. Tracer deployment tools. 4,966,233, Cl. 166-250.000.

Blum, Kenneth J., to Berkel & Company Contractors, Inc. Pile-forming apparatus for use in low density overburden. 4,966,498, Cl. 405-233.000.

Boag, Nigel, to Masco Building Products Corp. Reprogrammable lock and keys therefor. 4,966,021, Cl. 70-383.000.

Board of Regents, The University of Texas System: *See*—
Brown, Michael S.; Goldstein, Joseph L.; and Russell, David W., 4,966,837, Cl. 435-6.000.
Pak, Charles Y. C., 4,966,776, Cl. 424-677.000.

Boatwright, David A.: *See*—
Widener, Wade H.; and Boatwright, David A., 4,966,745, Cl. 376-264.000.

BOC Group, Inc., The: *See*—
Parker, Clayton E.; and Mostello, Robert A., 4,966,002, Cl. 62-31.000.

Bock, Ditmar H.; and Grace, John M., to Schrader Automotive, Inc. On-board tire pressure indicating system performing temperature-compensated pressure measurement, and pressure measurement circuitry thereof. 4,966,034, Cl. 73-146.500.

Boehringer Mannheim Corporation: *See*—
Engelhardt, John A.; and Tarr, Richard R., 4,966,509, Cl. 409-281.000.

Boehringer Mannheim GmbH: *See*—
Deneke, Ulfert; Guthlein, Werner; Weckerle, Wolfgang; and Wielinger, Hans, 4,966,855, Cl. 436-66.000.
Kaspar, Klaus P., 4,966,839, Cl. 435-7.000.

Boeing Company, The: *See*—
Davidson, Jerry W., 4,966,503, Cl. 408-59.000.
Hertzberg, Paul E., 4,966,802, Cl. 428-119.000.

Boettcher, Andreas, to BASF Aktiengesellschaft. Preparation of symmetric and asymmetric monoacetals of aromatic 1,2-diketones. 4,967,010, Cl. 568-315.000.

Bogachenko, Alexei G.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.

Bohm, Horst: *See*—
Schmidhuber, Karl; Grimm, Rainer; and Bohm, Horst, 4,966,409, Cl. 296-213.000.

Boiucaner, Leon: *See*—
Kornbrekke, Henning N.; and Boiucaner, Leon, 4,967,083, Cl. 250-341.000.

Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., to Wang Laboratories, Inc. Expert system with knowledge base having term definition hierarchy. 4,967,368, Cl. 364-513.000.

Bonafe, Jean L., to Aerospatiale Societe Nationale Industrielle. Speed reference system for piloting an aircraft. 4,967,363, Cl. 364-427.000.

Bone, Steven R.: *See*—
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 4,965,922, Cl. 29-426.400.

Borden, Peter G., to High Yield Technology. Velocity monitoring method and apparatus. 4,967,075, Cl. 250-237.00G.

Borg-Warner Automotive Diversified Transmission Products Corporation: *See*—
Carlton, Kenneth E., 4,966,267, Cl. 192-48.910.

Bork, Gerald R. Horse tack bit. 4,965,987, Cl. 54-7.000.

Bornoz, Claude: *See*—
Etienne, Jean-Daniel; Farine, Pierre-Andre ; and Bornoz, Claude, 4,966,150, Cl. 128-661.040.

Borom, Marcus P.: *See*—
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.

Borsani, Paolo, to Tecno S.p.A. Mobili e Forniture per Arredamento. Modular multilevel article of furniture. 4,966,341, Cl. 248-165.000.

Bosch, Bernd, to Gebruder Sucker & Franz Muller GmbH & Co. Method of controlling tension in a yarn sheet during winding. 4,966,333, Cl. 242-75.510.

Bosch-Siemens Hausgerate GmbH: *See*—
Aschberger, Maithias; Farber, Karlheinz; and Deininger, Anton, 4,966,232, Cl. 165-169.000.

Boston University, Trustees of: *See*—
Sengupta, Sisir, 4,966,962, Cl. 530-317.000.
Zimmerman, George O.; and Kaplan, Alvaro, 4,966,142, Cl. 228-263.120.

Bottenbruch, Ludwig: *See*—
Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, 4,966,958, Cl. 528-271.000.

Bourque, Roger Z. Tile cutting table. 4,965,935, Cl. 33-26.000.

Boutani, Hidekazu: *See*—
Shikinami, Yasuo; Tsuta, Kaoru; Taniguchi, Masahiko; and Boutani, Hidekazu, 4,966,953, Cl. 528-60.000.

Bowles, Margaret A.: *See*—
Bowles, William B.; and Bowles, Margaret A., 4,966,537, Cl. 425-87.000.

Bowles, William B.; and Bowles, Margaret A., to Dixon, John W. Hand-operated dispensers of semi-solid materials such as icing for cakes. 4,966,537, Cl. 425-87.000.

Bowling, Robert A.: *See*—
Davis, Cecil J.; Matthews, Robert; and Bowling, Robert A., 4,966,519, Cl. 414-786.000.

Bowman, Barry A.; Jeziorski, Stanley J.; Peterson, Francis A.; and Price, Ralph D., to J. I. Case Company. Directional control system for a tractor transmission. 4,966,044, Cl. 74-335.000.

Bowman, Harold M. Manhole cover support having interbraced top members. 4,966,489, Cl. 404-26.000.

Bowman, Timothy S., to Butler Manufacturing Company. Floor box for access floors. 4,967,041, Cl. 174-48.000.

BP Chemicals Limited: *See*—
Hodge, Stephen R.; and Pearce, Andrew, 4,966,723, Cl. 252-102.000.

Braasch, Gerd. Grinding tool body. 4,965,966, Cl. 51-273.000.

Braddick, Britt O., to Texas Iron Works, Inc. Cementing method and arrangement. 4,966,236, Cl. 166-291.000.

Braden, Victor K. Geometric tennis lanes. 4,966,368, Cl. 273-29.00A.

Bradford Company: *See*—
Bradford, Judson A., 4,966,280, Cl. 206-328.000.

Bradford, Judson A., to Bradford Company. Multiple-ply anti-static paperboard. 4,966,280, Cl. 206-328.000.

Brandes, Wilhelm: *See*—
Klausener, Alexander; Paulus, Wilfried; Schmitt, Hans-Georg; and Brandes, Wilhelm, 4,966,974, Cl. 546-294.000.

Brandl, Erich: *See*—
Zitz, Alfred; Barnthaler, Franz; and Brandl, Erich, 4,966,417, Cl. 299-33.000.

Brandt & Associates, Inc.: *See*—
Brandt, Robert H.; and Hoodlebrink, Merlin P., 4,966,693, Cl. 210-195.200.

Brandt, Inc.: *See*—
Burger, Fredric W., 4,966,357, Cl. 271-9.000.

Brandt, Robert H.; and Hoodlebrink, Merlin P., to Brandt & Associates, Inc. Apparatus for processing coolant. 4,966,693, Cl. 210-195.200.

Braun, Eugene R., to Eaton Corporation. Manual transmission and shift control therefor. 4,966,048, Cl. 74-745.000.

Braun GmbH & Co.: *See*—
Schatz, Wolfgang; and Schneider, Helmut, 4,966,819, Cl. 428-603.000.

Braun, Howard E.: *See*—
Tower, Stephen N.; Veronesi, Luciano; and Braun, Howard E., 4,966,747, Cl. 376-254.000.

Breckenfeld, Paul W.; and Broughton, George L., to Outboard Marine Corporation. Marine propulsion device. 4,966,567, Cl. 440-89.000.

Breiten, Charles P.: *See*—
Barber, Jeffrey R.; Breiten, Charles P.; Stanasolovich, David; and Theisen, Jacob F., 4,966,870, Cl. 437-228.000.

Brekkestran, Kevin L.; and Thomas, John C., to J.I. Case Company. Electronic control system for powershift transmission. 4,967,385, Cl. 364-571.030.

Brenner, Larry B.; and VanLeer, Paul W., to International Business Machines Corporation. System for periodically reallocating page frames in memory based upon non-usage within a time period or after being allocated. 4,967,353, Cl. 364-200.000.

Bretler, Haim: *See*—
Amon, Albert; Bleikclm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, 4,966,628, Cl. 106-30.000.

Brewer, Earl G., to General Motors Corporation. Coercivity in hot worked iron-neodymium boron type permanent magnets. 4,966,633, Cl. 148-101.000.

Brewer, Jeffrey L. Ankle protector. 4,966,134, Cl. 128-80.00H.

Brian, David A., to Cobden Chadwick Limited. Multi-color printing method and apparatus with registration means. 4,966,075, Cl. 101-211.000.

Bridgestone Corporation: *See*—
Kadota, Kuninobu, 4,966,214, Cl. 152-528.000.
Kawaguchi, Yasuyoshi; Ohashi, Masayuki; and Tansei, Hikaru, 4,966,213, Cl. 152-504.000.
Kawasaki, Kiyohito; Umezawa, Yujiro; and Sugawara, Toshio, 4,966,216, Cl. 152-556.000.
Oka, Takeshi, 4,966,215, Cl. 152-538.000.

Brighton, Jeffrey E.: *See*—
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey E., 4,966,865, Cl. 437-192.000.

Brisson, Alfred G.: *See*—
Nowacki, Christopher; and Brisson, Alfred G., 4,966,132, Cl. 128-24.00A.

British Aerospace Public Limited Company: *See*—
Fair, Martin L.; and Roberts, John C., 4,967,091, Cl. 250-504.00R.

British Gas plc: *See*—
Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., 4,967,199, Cl. 342-22.000.

Broadhurst, John H.: *See*—
Bacaner, Marvin B.; and Broadhurst, John H., 4,966,141, Cl. 128-207.140.

Bromine Compounds Ltd.: *See*—
Daren, Stephen, 4,967,026, Cl. 570-194.000.

Bronzavia Air Equipment: *See*—
Dieul, Jean Henri L., 4,966,425, Cl. 350-1.700.

Brooks, Lamar E. Method for vacuum drying thixotropic agents and the resultant low moisture thixotrope. 4,966,871, Cl. 501-150.000.

Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, to BASF Aktiengesellschaft. Optical recording medium. 4,966,798, Cl. 428-64.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,966,476, Cl. 400-208.000.
Sakaguchi, Masatoshi; and Kitazawa, Yasunori, 4,967,205, Cl. 346-76.0PH.
Suzuki, Makoto; Sakai, Toshio; Hattori, Tomoaki; and Takagi, Izumi, 4,967,227, Cl. 355-32.000.
Tanaka, Takahumi; and Ooshima, Nobuyasu, 4,966,090, Cl. 112-456.000.
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.

Broughton, George L.: *See*—
Breckenfeld, Paul W.; and Broughton, George L., 4,966,567, Cl. 440-89.000.

Brous, Donald W. Measurement and control of ultrafiltration in dialysis. 4,966,691, Cl. 210-87.000.

Brower, Dennis L.: *See*—
Ringlien, James A.; and Brower, Dennis L., 4,967,070, Cl. 250-223.00B.

Brown, Arthur E. Balanced reciprocating machines. 4,966,042, Cl. 74-44.000.

Brown, Michael S.; Goldstein, Joseph L.; and Russell, David W., to Board of Regents, The University of Texas System. Methods and compositions for the detection of familial hypercholesterolemia. 4,966,837, Cl. 435-6.000.

Brown, Paul; and Akselrud, Vitaly, to Husky Injection Molding Systems Ltd. Staged shooting pot for injection molding. 4,966,545, Cl. 425-557.000.

Broyles, Harry C. Trellis wire support clip and method of adapting metal grape stake for vertical trellising. 4,965,961, Cl. 47-46.000.

Broze, George J., Jr.: *See*—
Wun, Tze-Chein; Kretzmer, Kuniko K.; and Broze, George J., Jr., 4,966,852, Cl. 435-235.000.

Bruckner, Raimund; and Gimpera, Jose , to Didier-Werke AG. Self-sealing refractory parts of a regulating device for regulating the flow of molten metal from a metallurgical vessel. 4,966,314, Cl. 222-598.000.

Brun, Milivoj K.: *See*—
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.

Bruning, Werner, to Alfred Fischbach KG. Mixing device. 4,966,468, Cl. 366-333.000.

Brunswick Corporation: *See*—
Hesterberg, William G.; Donahue, Raymond J.; and Cleary, Terrance M., 4,966,220, Cl. 164-34.000.
Mapes, Charles W.; and Snyder, Richard H., 4,966,347, Cl. 248-643.000.

Brust, Hans D., to Siemens Aktiengesellschaft. Method and apparatus for phase measurement of signals at a measuring point by an unmodulated particle beam. 4,967,150, Cl. 324-158.00R.

Bryan, James S.; and Rush, James B., to Dayco Products, Inc. Shape retention hose construction. 4,966,202, Cl. 138-172.000.

Bryan, James S.: *See*—
Rush, James B.; Bryan, James S.; Henry, Pearison W.; and Trantham, Richardson J., 4,966,741, Cl. 264-154.000.

Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., to Eastman Kodak Company. X-ray intensifying screen including a titanium activated hafnium dioxide phosphor containing neodymium to reduce afterglow. 4,967,085, Cl. 250-483.100.

Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., to Eastman Kodak Company. X-ray intensifying screen including a titanium activated hafnium dioxide phosphor containihg ytterbium to reduce afterglow. 4,967,087, Cl. 250-483.100.

Buchanan, William W., to Tescor, Inc. Method of preparing customized written examinations. 4,967,354, Cl. 364-419.000.

Buchar, Wayne A.; Nau, Keith A.; and Lavallee, Pierre A., to Xerox Corporation. Fixed full width array scan head calibration apparatus. 4,967,233, Cl. 355-233.000.

Bucheler, Manfred: *See*—
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, 4,966,772, Cl. 424-482.000.

Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., to International Flavors & Fragrances Inc. Use of sclareolide in augmenting or enhancing the organoleptic properties of foodstuffs. 4,966,783, Cl. 426-565.000.

Buehler, Ltd.: *See*—
Linke, Thomas A.; Livingston, Troy W.; Wanha, Christopher D.; and Shewey, Charles E., 4,966,538, Cl. 425-144.000.

Buell Industries, Inc.: *See*—
Peterson, Francis C., 4,966,398, Cl. 285-319.000.

Buerk, Hermann; Wagner, Thomas; and Steinhauser, Michael, to Siemens Aktiengesellschaft. Method for removing photoresist. 4,966,664, Cl. 204-146.000.

Bugga, Ratnakumar V.; DiStefano, Salvador; Williams, Roger M.; and Bankston, Clyde P., to United States of America, National Aeronautics and Space Administration. Organic cathode for a secondary battery. 4,966,823, Cl. 429-104.000.

Bull HN Information Systems Italia S.p.A.: *See*—
Rendina, Francesco; and Savogin, Lucio, 4,967,390, Cl. 364-900.000.

Bullock, R. Morris, to United States of America, Energy. Hydrogenation using hydrides and acid. 4,967,031, Cl. 585-250.000.

Bunge (Australia) Pty. Ltd.: *See*—
Patroni, Joseph J., 4,966,963, Cl. 530-351.000.

Burger, Fredric W., to Brandt, Inc. Apparatus for dispensing a preselected mix of paper currency or the like. 4,966,357, Cl. 271-9.000.

Burgin, Grady W.: *See*—
Keys, Daniel W.; and Burgin, Grady W., 4,966,713, Cl. 210-705.000.

Burling, Michael R., to Burling, Michael R. Grip assembly for archery bow. 4,966,124, Cl. 124-23.100.

Burnett, John B.: *See*—
Woods, Ernest C., Jr.; and Burnett, John B., 4,967,147, Cl. 324-158.00F.

Burns, Cameron A.; and Burns, Terry A. Protective sleeve for hypodermic needle. 4,966,592, Cl. 604-198.000.

Burns, Ian W.: *See*—
Nylander, Claes I.; and Burns, Ian W., 4,966,671, Cl. 204-153.140.

Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, to Milton Roy Company. Optical system for a multidetector array spectrograph. 4,966,458, Cl. 356-328.000.

Burns, Terry A.: *See*—
Burns, Cameron A.; and Burns, Terry A., 4,966,592, Cl. 604-198.000.

Burositzmobelfabrik Friedrich-W. Dauphin GmbH & Co.: *See*—
Dauphin, Elke, 4,966,412, Cl. 297-301.000.

Burrascano, Michelle: *See*—
Payne, Jewel; Burrascano, Michelle; and Soares, George G., 4,966,765, Cl. 424-93.000.

Buschmann, Ernst: *See*—
Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,967,003, Cl. 564-381.000.

Bussink, Jan; and van der Meer, Roelof. Thermoplastic mixture with polyfunctional compound. 4,966,943, Cl. 525-68.000.

Butcher, David W.; and Post, Stephen R., to Ilford Limited. Post-exposure dye treatment in the production of holograms. 4,966,440, Cl. 350-320.000.

Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., to FMC Corporation. Plant harvester. 4,965,993, Cl. 56-327.100.

Butler Manufacturing Company: *See*—
Bowman, Timothy S., 4,967,041, Cl. 174-48.000.
Domigan, Charles N.; and Harmon, J. David, 4,965,972, Cl. 52-221.000.

Butt, Sheldon H., to International Electronic Research Corp. Hermetic microminiature packages. 4,967,260, Cl. 357-70.000.

Buxbaum, Gunter: *See*—
Westerhaus, Axel; Ganter, Karl-Werner; and Buxbaum, Gunter, 4,966,641, Cl. 106-456.000.

Buysch, Hans-Josef: *See*—
Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, 4,966,958, Cl. 528-271.000.

Buzzi, Gunter: *See*—
Knapp, Alfons; and Buzzi, Gunter, 4,966,789, Cl. 427-248.100.

C. A. Blockers, Inc.: *See*—
Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 4,966,169, Cl. 131-31.000.

Cables de Comunicaciones, S.A.: *See*—
Andreu, Enrique M.; Gomez, Fernando N.; Vallejo, Jose L. R.; and Ostariz, Jose L. S., 4,966,956, Cl. 528-185.000.

Cagan, Uri: *See*—
Goodman, Geoffrey; Cagan, Uri; and Orlans, Yitzhak, 4,966,701, Cl. 210-419.000.

Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., to Hewlett-Packard Company. Serial data frame generator for testing telecommunications circuits. 4,967,412, Cl. 371-20.100.

Calcomp Inc.: *See*—
Marzouk, Fred, 4,966,560, Cl. 439-585.000.

Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., to Merck & Co., Inc. 6-substituted 5-hydroxy-2,3-dihydrobenzofurans as inhibitors of leukotriene biosynthesis. 4,966,907, Cl. 514-337.000.

Callahan, Robert W.: *See*—
Cussler, Edward L.; Callahan, Robert W.; and Alexander, Paul R., Jr., 4,966,707, Cl. 210-632.000.

Callier, Bernard; and Maynard, Jean-Pierre, to General Electric CGR S.A. Stabilized power supply with reduced ripple factor. 4,967,333, Cl. 363-17.000.

Callinan, Kevin M.; and Ennis, James P., to Uniroyal Plastics Co., Inc. Conformable abrasive article. 4,966,609, Cl. 51-295.000.

Calzi, Claudio, to Instrumentation Laboratory SpA. Electrochemical cell for measuring ionic activity in a solution and its method of use. 4,966,670, Cl. 204-406.000.

Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., to Faroudja, Ives C. Television scan line doubler including temporal median filter. 4,967,271, Cl. 358-105.000.

Campbell, Robert M.; and Duer, Mark G. Capture apparatus for marine animals. 4,965,955, Cl. 43-4.000.

Campione, Troy J.: *See*—
Young, David A.; Jones, Larry O.; and Campione, Troy J., 4,966,874, Cl. 502-117.000.

Canadian Occidental Petroleum Ltd.: *See*—
Gregoli, Armand A.; Olah, Andrew M.; Hamshar, John A.; and Rimmer, Daniel P., 4,966,235, Cl. 166-267.000.

Canadian Patents and Development Limited-Societe Canadienne des Brevets et d'Exploitation Limitee: *See*—
Monchalin, Jean-Pierre, 4,966,459, Cl. 356-358.000.

Canet, Roland: *See*—
Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, 4,966,729, Cl. 252-511.000.

Canitrot, Didier; Ducrot, Christian; and Terasse, Jean-Francois, to Equiepments Electroques Moteur. High voltage electrical power supply device for the auxiliary circuit of a motor vehicle. 4,967,137, Cl. 322-7.000.

Canon Kabushiki Kaisha: *See*—
Akashi, Akira, 4,967,225, Cl. 354-402.000.
Hasegawa, Takeshi; and Kobayashi, Akihiko, 4,967,209, Cl. 346-140.00R.
Masuda, Shunichi, 4,967,377, Cl. 364-518.000.
Motomaru, Akira, 4,966,084, Cl. 108-51.300.
Nishimura, Tetsuharu, 4,967,072, Cl. 250-231.160.
Nishio, Tetsuya; Kiuchi, Masayoshi; and Ohara, Tsunemasa, 4,967,216, Cl. 354-173.100.
Suzuki, Ryoichi, 4,967,223, Cl. 354-402.000.
Terasawa, Koji; Okamoto, Hideaki; and Yamaguchi, Hideki, 4,967,204, Cl. 346-1.100.

Yamada, Etsuo, 4,967,417, Cl. 372-29.000.
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Carberry, Terrance K., to AWD Technologies, Inc. Soil and groundwater remediation system. 4,966,654, Cl. 202-177.000.

Carbovan Inc.: *See—*
Lakshmanan, Vaikuntam I.; Melnbardis, Dzinsars; Geisler, Robert A.; and McQueen, Nairn M., 4,966,761, Cl. 423-118.000.

Cardinal, Paul J.: *See—*
Jamieson, Donald F.; and Cardinal, Paul J., 4,966,705, Cl. 210-605.000.

Carlson, Casey L.: *See—*
Bessinger, Walter L.; Stumpf, William E.; and Carlson, Casey L., 4,966,343, Cl. 248-243.000.

Carlton, Kenneth E., to Borg-Warner Automotive Diversified Transmission Products Corporation. Ball screw actuated clutch combination. 4,966,267, Cl. 192-48.910.

Carmello, Diego; and Guglielmo, Giorgio, to Ausimont S.p.A. Process for preparing 1,1,1-trifluoro-2,2-dichloroethane by hydrofluorination in the presence of catalysts. 4,967,023, Cl. 570-166.000.

Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, to Le Carbone-Lorraine. Material having a resistivity with a positive temperature coefficient. 4,966,729, Cl. 252-511.000.

Carr, Richard V. C., to Air Products and Chemicals, Inc. Coproduction of propanediamine and alkylated aminopropylamines. 4,967,006, Cl. 564-490.000.

Carrara, Elio, to Lamiflex S.p.A. Separator structure for guiding weaving loom harness frames. 4,966,203, Cl. 139-91.000.

Carrier Corporation: *See—*
Wood, Russell E., 4,966,013, Cl. 62-193.000.

Carrington Laboratories, Inc.: *See—*
McAnalley, Bill H., 4,966,892, Cl. 514-54.000.

Carroll, David T., to GardenAmerica. Controller for outdoor lighting systems. 4,967,098, Cl. 307-140.000.

Carver, Wayne D.: *See—*
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., 4,966,299, Cl. 220-85.0VR.

Casagrande, Francesco; Foa, Marco; Gardano, Andrea; and Chapoy, L. Lawrence, to Montedison S.p.A. Liquid-crystalline, thermotropic aromatic polyester from hydroquinone mixture. 4,966,957, Cl. 528-193.000.

Casariego, Adrian: *See—*
Fournier, Jean; and Casariego, Adrian, 4,966,100, Cl. 122-6.00A.

Casio Computer Co., Ltd.: *See—*
Shiraki, Kazuyoshi; Ishiguro, Shiro; and Matsubara, Akinori, 4,966,052, Cl. 84-715.000.
Tajima, Youichiro, 4,966,051, Cl. 84-663.000.
Takeda, Tsuneharu, 4,966,445, Cl. 350-377.000.

Cassella Aktiengesellschaft: *See—*
Zoller, Gerhard; Beyerle, Rudi; and Schindler, Ursula, 4,966,901, Cl. 514-211.000.

Castelli, Vincent J.; and Yeager, William L., to United States of America, Navy. Antifouling organometallic polymer rubber coverings. 4,966,925, Cl. 523-177.000.

Caoutchouc Manufacture et Plastiques: *See—*
de Guillebon, Hubert, 4,966,571, Cl. 474-111.000.

Caterpillar Inc.: *See—*
Eichler, Henry; and Jones, Derrell G., 4,966,290, Cl. 212-258.000.
Hoffman, John P., 4,967,309, Cl. 361-160.000.

Causey, David H.: *See—*
Lo, Young S.; Shamblee, Dwight A.; Causey, David H.; and Mays, Richard P., 4,966,979, Cl. 548-950.000.

Cavazos, Danny F. Fish gripping apparatus. 4,965,954, Cl. 43-4.000.

Cedergreen, Steven D.; Aspiri, Ray; Hunter, Kim R.; and Chiu, Butkui, to Tempress, Inc. Fish holder. 4,965,958, Cl. 43-55.000.

Celanese Corporation: *See—*
Cussler, Edward L.; Callahan, Robert W.; and Alexander, Paul R., Jr., 4,966,707, Cl. 210-632.000.

Central Glass Company, Limited: *See—*
Okuyama, Takashi; and Yamauchi, Yutaka, 4,966,547, Cl. 432-9.000.
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,967,202, Cl. 343-713.000.

Centre National de la Recherche Scientifique (C.N.R.S.): *See—*
Bisagni, Emile R. B.; and Greletepouse Rautureau, Marilys, 4,966,971, Cl. 546-64.000.

Centromint Company Establishment: *See—*
Hinterreiter, Ignaz, 4,966,305, Cl. 221-229.000.

Cerinic, Marco M.; and Marabini, Simone, to Industria Farmaceutica Serono SpA. Treatment of inflammatory articular diseases. 4,966,889, Cl. 514-11.000.

Cerugeira, Benedito S. Monoblock pallet. 4,966,083, Cl. 108-51.100.

Cetus Corporation: *See—*
Gelfand, David H., 4,966,840, Cl. 435-69.100.
McCormick, Francis P.; Innis, Michael A.; and Ringold, Gordon M., 4,966,843, Cl. 435-69.510.

Chalmers, David W.: *See—*
Sobodos, David W.; and Chalmers, David W., 4,966,391, Cl. 280-777.000.

Chamberlain Group, The: *See—*
Kitahata, Roy S.; and Iha, Kiyoshi, 4,965,905, Cl. 15-97.100.

Chan, Anthony: *See—*
Weber, Jarvy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, 4,967,061, Cl. 219-438.000.

Chan-Yu-King, Roch: *See—*
Meyers, Cal Y.; and Chan-Yu-King, Roch, 4,967,021, Cl. 570-101.000.

Chang, Suae-Chen, to Ethyl Corporation. Low smoke coating compositions using phosphonitrilic elastomeric blends. 4,966,937, Cl. 524-538.000.

Chang, Yin; and Fu, Yao A., to National Science Council. Four-channel anomaloscope. 4,966,453, Cl. 351-242.000.

Chaplin, Daniel J., to Grass Valley Group, Inc., The. Non-linear keyer. 4,967,277, Cl. 358-183.000.

Chapoy, L. Lawrence: *See—*
Casagrande, Francesco; Foa, Marco; Gardano, Andrea; and Chapoy, L. Lawrence, 4,966,957, Cl. 528-193.000.

Charles, Richard J.; and Gaddipati, Achuta R., to General Electric Company. Ferrite composite containing silver metallization. 4,966,625, Cl. 75-234.000.

Chen, J. H.: *See—*
Labes, Mortimer M.; and Chen, J. H., 4,966,817, Cl. 428-552.000.

Cherdron, Harald; Deckers, Hellmuth; Herold, Friedrich; and Hess, Reiner, to Hoechst Aktiengesellschaft. Aromatic copolyether amide which can be processed as a thermoplastic, process for its preparation, and its use for the production of molding. 4,966,955, Cl. 528-183.000.

Chern, Terry S., to Du Pont de Nemours, E. I., and Company. Fiber creel humidification. 4,966,017, Cl. 68-5.00C.

Chernyavsky, Jury Y.: *See—*
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.

Cherry Corporation, The: *See—*
Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., 4,965,933, Cl. 29-882.000.

Cheskis, Harvey P.; Watson, W. Gary; and Sankaranarayanan, Ashok, to Olin Corporation. Substrate orientation in a gas-atomizing spray-depositing apparatus. 4,966,224, Cl. 164-429.000.

Cheval, Benoit: *See—*
Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, 4,966,293, Cl. 220-1.500.

Chevron Research Company: *See—*
Schinski, William L.; and Denisevich, Peter, Jr., 4,966,988, Cl. 558-342.000.

Chiba, Akihiko: *See—*
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.

Chick, James P., to Chick, James P. Wide-opening vise. 4,966,350, Cl. 269-43.000.

Child, Jonathan E., to Mobil Oil Corporation. Fluidized bed coal/coke combustion. 4,966,087, Cl. 110-345.000.

Childers, Winthrop D., to Hewlett-Packard Company. Offset nozzle droplet formation. 4,967,208, Cl. 346-140.00R.

Chiron-Werke GmbH & Co. KG: *See—*
Winkler, Hans-Henning; Rutschle, Eugen; and Haninger, Rudolf, 4,966,505, Cl. 409-134.000.

Chisso Corporation: *See—*
Akitaya, Shinichi; Fukazawa, Toru; Nozokido, Yutaka; and Tabata, Nobuchika, 4,966,931, Cl. 524-100.000.
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,966,727, Cl. 252-299.610.
Kawano, Michinori, 4,966,808, Cl. 428-224.000.

Chiu, Butkui: *See—*
Cedergreen, Steven D.; Aspiri, Ray; Hunter, Kim R.; and Chiu, Butkui, 4,965,958, Cl. 43-55.000.

Chodorge, Jeannine; Senet, Jean-Pierre; and Wooden, Gary, to Societe Nationale des Poudres et Explosifs. Process for the preparation of chlorides of carboxylic acids. 4,966,995, Cl. 562-861.000.

Chou, Yueting, to Monsanto Company. Process for preparing sulfonyl acids. 4,966,731, Cl. 260-400.000.

Chow, Loren A.: *See—*
Chow, Peter P.; Lo, Josephine N.; and Chow, Loren A., 4,966,138, Cl. 128-155.000.

Chow, Peter P.; Lo, Josephine N.; and Chow, Loren A. Puncture protector. 4,966,138, Cl. 128-155.000.

Christos, Philip H.: *See—*
Wark, Rick; Christos, Philip H.; and Williamson, Karl M., 4,966,689, Cl. 209-384.000.

Chronar Corp.: *See—*
Matlin, Ronald W.; Lenskold, Richard K.; and Rangarajan, Anand, 4,966,631, Cl. 136-244.000.

Chrysler Corporation: *See—*
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., 4,966,299, Cl. 220-85.0VR.

Chudo, Masuo: *See—*
Nomura, Toshio; and Chudo, Masuo, 4,966,501, Cl. 407-119.000.

Ciba-Geigy Corporation: *See—*
Banks, Christopher P.; Irving, Edward; Renner, Alfred; and Smith, Terence J., 4,966,923, Cl. 522-167.000.
Eckhardt, Wolfgang; Meyer, Alfred; and Kunz, Walter, 4,966,908, Cl. 514-340.000.

Rempfler, Hermann; Durr, Dieter; and Thummel, Rudolf C., 4,966,622, Cl. 71-92.000.
Singer, Heinrich; Stechele, Werner; and Bernhein, Michael, 4,966,725, Cl. 252-8.800.
von der Crone, Jost, 4,966,930, Cl. 524-83.000.

Cigich, Joseph G.: *See*—
John, Clarence D., Jr.; Jarabak, Beverly T.; and Cigich, Joseph G., 4,966,177, Cl. 134-61.000.

Cimock, Benjamin J., to I & K Trading Company. Flashlight wand. 4,967,321, Cl. 362-101.000.

Ciokajlo, John J.; and Ritchie, Henry B., to General Electric Company. Jet engine turbine support. 4,965,994, Cl. 60-39.750.

Clardy, Jon: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.

Clarion Co., Ltd.: *See*—
Mitsutsuka, Syuichi, 4,967,113, Cl. 310-313.00R.

Clark, Jack G., Jr.; and Schouster, Joseph W., to Zip Strip, Inc. Check strip attachment and removal apparatus. 4,966,644, Cl. 156-247.000.

Clark, Jack P.: *See*—
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.

Clark, John I.; Farr, Andrew G.; and Smith, Stacia A., to Washington Research Foundation. Immunoregulatory agents. 4,966,911, Cl. 514-385.000.

Clark, Roy W.: *See*—
Stephens, Howard; and Clark, Roy W., 4,966,253, Cl. 181-227.000.

Clark, William M., Jr.; Walden, Robert H.; and Utlaut, Mark W., to Hughes Aircraft Company. Charge-coupled device with focused ion beam fabrication. 4,967,250, Cl. 357-24.000.

Clarke, Kathryn E.; Drake, John E., Jr.; Pozefsky, Diane P.; and Siddall, William E., to International Business Machines Corporation. Method of selecting least weight routes in a communications network. 4,967,345, Cl. 364-200.000.

Claude, Georges. Sealed watchcase. 4,967,402, Cl. 368-280.000.

Claydon, Glenn S.; and Laughton, William J., to General Electric Company. HVIC primary side power supply controller including full-bridge/half-bridge driver. 4,967,332, Cl. 363-17.000.

Cleary, Terrance M.: *See*—
Hesterberg, William G.; Donahue, Raymond J.; and Cleary, Terrance M., 4,966,220, Cl. 164-34.000.

Clement, Robert A.; Tam, Wilson; and Wang, Ying, to Du Pont de Nemours, E. I., and Company. Nonlinear optical devices from derivatives of stilbene and diphenylacetylene. 4,966,730, Cl. 252-589.000.

Cleveland Clinic Foundation, The: *See*—
Nose, Yukihiko; Malchesky, Paul S.; and Horiuchi, Takashi, 4,966,709, Cl. 210-651.000.

Cobden Chadwick Limited: *See*—
Brian, David A., 4,966,075, Cl. 101-211.000.

Coca-Cola Co., The: *See*—
Aschberger, Matthias; Farber, Karlheinz; and Deininger, Anton, 4,966,232, Cl. 165-169.000.
Credle, William S., Jr.; Rudick, Arthur G.; and Jarocki, George J., 4,966,306, Cl. 222-1.000.

Cochran, William T.: *See*—
Upp, Daniel C.; and Cochran, William T., 4,967,405, Cl. 370-1.000.

Codex Corporation: *See*—
Scavezze, Daniel C.; Leeser, Miriam E.; Kammerer, Gerald A.; and Prescott, William R., 4,967,344, Cl. 364-200.000.

Coe, Everett L., Jr.: *See*—
Krigmont, Henry V.; and Coe, Everett L., Jr., 4,966,610, Cl. 55-5.000.

Cogan, Adrian I.; and Thornton, Neill R., to Siliconix incorporated. Trench power MOSFET device. 4,967,245, Cl. 357-23.400.

Cohen, Wilburt, to Advanced Golf Concepts, Inc. Golf ball heating device. 4,967,062, Cl. 219-521.000.

Colby, Ralph S.; Doumas, William M.; Fouere, Jean-Claude; and Rectenwald, Robert M., to International Business Machines Corporation. Printing machine with toner density balance in solid areas and line strokes. 4,967,211, Cl. 346-160.000.

Colgate-Palmolive Company: *See*—
Gaffab, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,966,777, Cl. 424-52.000.

Colin Electronics Co., Ltd.: *See*—
Perry, William D.; and Winter, Dean C., 4,966,156, Cl. 128-672.000.

Collette, Wayne N.: *See*—
Krishnakumar, Suppayan M.; Nahill, Thomas E.; and Collette, Wayne N., 4,966,543, Cl. 425-522.000.

Collins, Donald A., Jr., to NCR Corporation. Method for detecting low battery voltage in portable scanning systems. 4,967,188, Cl. 340-636.000.

Collision Safety Engineering Inc.: *See*—
Warner, Charles Y.; Strother, Charles E.; Struble, Donald E.; and Wille, Milton G., 4,966,388, Cl. 280-730.000.

Colsen, Ronnie; Kairia, Alexander; and Deller, Andrew L., to Tradatlantex AG. Combined sound generating device and electrical acupuncture device and method for using the same. 4,966,164, Cl. 128-789.000.

Colt Industries Inc.: *See*—
McCabe, Ralph P., 4,966,195, Cl. 137-625.610.

COMFUTURE, Visual Information Management Systems: *See*—
Eilon Ginsburg, 4,967,373, Cl. 364-518.000.

Commonwealth of Puerto Rico: *See*—
Mercado-Torres, Roberto, 4,966,366, Cl. 273-1.00R.

Commonwealth Scientific and Industrial Research Organization: *See*—
Davey, Kenneth R., 4,965,911, Cl. 17-51.000.

Communications Satellite Corporation: *See*—
Kao, Yih-Sien; and Lee, Lin-nan, 4,967,272, Cl. 358-135.000.

Compagnie Oris Industrie S.A.: *See*—
Ferrua, Bernard; and Moulin, Claude, 4,966,838, Cl. 435-7.000.

Confer, Keith A.; and Rasmussen, Michael E., to General Motors Corporation. Overcenter clamp. 4,965,914, Cl. 24-270.000.

Connectron, Inc.: *See*—
Norden, Alexander R., 4,966,561, Cl. 439-622.000.

Connell, James J.: *See*—
McGregor, Charles W.; and Connell, James J., 4,966,932, Cl. 524-245.000.

Conner, Arlie R., to In Focus Systems, Inc. Hybrid color display system. 4,966,441, Cl. 350-335.000.

Conoco Specialty Products Inc.: *See*—
Kalnins, Charles M.; Tuckett, Phillip C.; and Hansen, Soren R. Z., 4,966,703, Cl. 210-512.100.

Conti, Ralph S.: *See*—
Rich, Arthur; Conti, Ralph S.; and Agranoff, Bernard W., 4,967,084, Cl. 250-361.00R.

Continental PET Technologies, Inc.: *See*—
Krishnakumar, Suppayan M.; Nahill, Thomas E.; and Collette, Wayne N., 4,966,543, Cl. 425-522.000.

Contraves AG: *See*—
Berner, Gianni, 4,967,313, Cl. 361-400.000.

Cook, Alexander; Dhyanchand, John; Palaniappan, Rasappa; and Schmitt, Dwight, to Sundstrand Corporation. Inverter input/output filter system. 4,967,334, Cl. 363-34.000.

Cook, Donald W., to Elixir Industries. Stone shield. 4,966,378, Cl. 280-154.000.

Cooke, Martin E.; and Turnbull, Andrew A., to U.S. Philips Corp. Temperature compensated thermal radiation detectors. 4,967,082, Cl. 250-338.300.

Coonradt, Robert A. Insulated drinking container. 4,966,300, Cl. 220-90.200.

Cooper Industries, Inc.: *See*—
Schaub, Frederick S.; and Smith, Jesse G., 4,966,103, Cl. 123-276.000.

Cooper, Jonni; and Adams, Tello, to Cooper, Jonni. Multiple parameter monitoring system for hospital patients. 4,966,154, Cl. 128-671.000.

Cordes, Paul B.: *See*—
Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., 4,967,199, Cl. 342-22.000.

Cornell Research Foundation, Inc.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.
Saxena, Brij B.; Rathnam, Premila; and Singh, Mukul, 4,966,888, Cl. 514-2.000.

Cornil, Jean-Philippe, to Gaz de France. Integrated multifunction regulator station for gas supply to a secondary mains. 4,966,307, Cl. 222-3.000.

Corral, Edward D.; and Lopez, Steven R. Eyeglass flotation apparatus. 4,966,451, Cl. 351-43.000.

Cortese, Richard: *See*—
Guittard, George V.; Wong, Patrick S. L.; Theeuwes, Felix; and Cortese, Richard, 4,966,769, Cl. 424-473.000.

Cosman, Eric R. Thermometric cardiac tissue ablation electrode with ultra-sensitive temperature detection. 4,966,597, Cl. 606-50.000.

Coughlin, Daniel J.; Belinka, Benjamin A.; and Alvarez, Vernon L., to Cytogen Corporation. Radiohalogenated compounds for site specific labeling. 4,966,999, Cl. 564-150.000.

Council of Scientific & Industrial Research: *See*—
Deshmukh, Abdul R. A. S.; Bhawal, Baburao M.; Shiralkar, Vasudeo P.; and Rajappa, Srinivasachari, 4,967,007, Cl. 564-501.000.

Covell, O. Dexter. Decorative wall hanging. 4,966,793, Cl. 428-7.000.

Cowell, Wiley M.; Malmberg, Quentin C.; and Edgar, Jon M., to Allied-Signal Inc. Advanced hybrid air/vapor cycle ECS. 4,966,005, Cl. 62-79.000.

Cowles, Harold R.: *See*—
Schumacher, John C.; McMenamin, Joseph C.; Anderson, Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., 4,966,611, Cl. 55-20.000.

Cox, Abraham J.; and Meyer, Max F., Jr., to Eastern Kodak Company. Copolyesters and formulations thereof for adhesives. 4,966,959, Cl. 528-272.000.

Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; and Beltzer, Morton, to Exxon Research & Engineering Company. Multifunctional molybdenum and sulfur containing lube additives. 4,966,719, Cl. 252-42.700.

Craig, Daniel H., to Hercules Incorporated. Polyacrylate dispersions prepared with a water-soluble conjugated unsaturated monomer in the absence of a protective colloid. 4,966,939, Cl. 524-811.000.

Credle, William S., Jr.; Rudick, Arthur G.; and Jarocki, George J., to Coca-Cola Company, The. Beverage dispenser system using volumetric ratio control device. 4,966,306, Cl. 222-1.000.

Cree Research, Inc.: *See*—
Edmond, John A., 4,966,862, Cl. 437-100.000.

Crisafulli, Rosemarie M.: *See*—
Gaffab, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,966,777, Cl. 424-52.000.

Crone, Jerry A.: *See*—
English, Roe E.; Kilgore, Michael A.; and Crone, Jerry A., 4,967,337, Cl. 364-184.000.

Crosson, Craig E.; Barton, Beverly E.; Garner, William H.; and Gwon, Arlene E., to Allergan, Inc. Prevention of lens-related tissue growth in the eye. 4,966,577, Cl. 604-20.000.

Crotti, Pier L.; and Iazzi, Nadia, to SGS-Thomson Microelectrics s.r.l. Process for forming self-aligned, metal-semiconductor contacts in integrated MISFET structures. 4,966,867, Cl. 437-195.000.

Culshaw, Stephen; and Vos, Eddy, to Procter & Gamble Company, The. Viscous hard-surface cleaning compositions containing a binary glycol ether solvent system. 4,966,724, Cl. 252-158.000.

Cummins Engine Company, Inc.: *See*—
Bentz, Joseph C.; Yonushonis, Thomas M.; Patten, James W.; and Fujimoto, Yuji, 4,966,108, Cl. 123-90.510.

Cunard, Joel C., to Hedstrom Corporation. Knock-down wheel assembly. 4,966,419, Cl. 301-2.500.

Curtis, Gregory J. Window insulating device. 4,966,129, Cl. 126-430.000.

Cussler, Edward L.; Callahan, Robert W.; and Alexander, Paul R., Jr., to Celanese Corporation. Liquid/liquid extractions with microporous membranes. 4,966,707, Cl. 210-632.000.

Custom Engineered Materials Inc.: *See*—
Schumacher, John C.; McMenamin, Joseph C.; Anderson, Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., 4,966,611, Cl. 55-20.000.

Cutler, Christopher A.: *See*—
Wallace, William D.; and Cutler, Christopher A., 4,966,161, Cl. 128-748.000.

Cylink Corporation: *See*—
Omura, Jimmy K.; Nightingill, Leslie; and Sabin, Michael J., 4,967,389, Cl. 364-900.000.

Cytogen Corporation: *See*—
Coughlin, Daniel J.; Belinka, Benjamin A.; and Alvarez, Vernon L., 4,966,999, Cl. 564-150.000.

Dai Nippon Insatsu Kabushiki Kaisha: *See*—
Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.

Daicel Chemical Industries, Ltd.: *See*—
Hasegawa, Masaki; Saigo, Kazuhiko; Yuki, Yoichi; and Tachibana, Kouzou, 4,966,985, Cl. 556-116.000.
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 4,966,694, Cl. 210-198.200.

Daikin Industries, Ltd.: *See*—
Maeda, Tadayuki; Koyama, Satoshi; and Okamura, Kazuo, 4,967,025, Cl. 570-177.000.

Daimler-Benz AG: *See*—
Steininger, Gerd, 4,965,915, Cl. 24-607.000.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Yamada, Takuma, 4,966,094, Cl. 118-698.000.

Daiwa Seiko Inc.: *See*—
Kaneko, Kyoichi, 4,966,335, Cl. 242-255.000.

Dallas Semiconductor Corporation: *See*—
Lee, Robert D.; and Mounger, Robert W., 4,967,108, Cl. 307-520.000.

D'Ambrosia, George C.; and Ludden, Christopher A., to Eastman Kodak Company. Method of intrusion detection over a wide area. 4,967,183, Cl. 340-552.000.

Dammoto, Yoshihisa: *See*—
Fujita, Takayoshi; Nishinaka, Hisao; Obota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, 4,965,919, Cl. 28-220.000.

Dan Mamtirim: *See*—
Neeman, Avraham, 4,966,328, Cl. 239-524.000.

Danfoss A/S: *See*—
Thuesen, Sven E.; and Gollnow, Klaus, 4,966,006, Cl. 62-89.000.

Danieli & C. Officine Meccaniche SpA: *See*—
Poloni, Alfredo, 4,966,060, Cl. 83-105.000.

Daniels, Michael P.: *See*—
Belcher, Bryan L.; and Daniels, Michael P., 4,966,231, Cl. 165-166.000.

Danielsson, Kurt, to Morgardshammar AB. Wire-rod block. 4,966,027, Cl. 72-249.000.

Daren, Stephen, to Bromine Compounds Ltd. Process for the production of chloromethyl phenethyl bromide. 4,967,026, Cl. 570-194.000.

Datatape Incorporated: *See*—
Grant, Frederic F.; and Grant, John, 4,967,290, Cl. 360-64.000.

DataTrak, Inc.: *See*—
Murrer, Edward S.; and Imran, Mir A., 4,967,305, Cl. 361-172.000.

Daum, Lothar: *See*—
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, 4,966,894, Cl. 514-56.000.

Dauphin, Elke, to Burositzmobelfabrik Friedrich-W. Dauphin GmbH & Co. Chair, in particular office chair. 4,966,412, Cl. 297-301.000.

Davern, John W.: *See*—
Speller, Thomas H., Sr.; Davern, John W.; Weaver, Jeffrey P.; and Andrews, Mark J., 4,966,323, Cl. 227-51.000.

Davey, Kenneth R., to Commonwealth Scientific and Industrial Research Organization. Decontamination of meat. 4,965,911, Cl. 17-51.000.

David, Victor A.: *See*—
Deutch, Alan H.; and David, Victor A., 4,966,846, Cl. 435-172.300.

Davidson, Jerry W., to Boeing Company, The. Drill bit for drilling a hole in layered material of different hardness. 4,966,503, Cl. 408-59.000.

Davies, Christopher P., to LGZ Landis & Gyr Zug, AG. Active current transformer. 4,967,145, Cl. 324-127.000.

Davies, Robert B.; Schultz, Warren J.; and Stipanuk, James J., to Motorola, Inc. High voltage bridge interface. 4,967,336, Cl. 363-132.000.

Davini, Mark A. Splint system. 4,966,137, Cl. 128-87.00R.

Davis, Cecil J.; Matthews, Robert; and Bowling, Robert A., to Texas Instruments Incorporated. Integrated circuit processing system. 4,966,519, Cl. 414-786.000.

Davis, Robert A.: *See*—
Lai, Hoi K.; and Davis, Robert A., 4,966,910, Cl. 514-383.000.
Relyea, Douglas I.; Regis, Richard R.; and Davis, Robert A., 4,966,912, Cl. 514-397.000.

Dawes, Robert L., to E-Systems, Inc. Adaptive processing system having an array of individually configurable processing components. 4,967,340, Cl. 364-200.000.

Day, John J. Electrical power cell energized by high frequency electromagnetic radiation. 4,967,112, Cl. 310-304.000.

Dayco Products, Inc.: *See*—
Bryan, James S.; and Rush, James B., 4,966,202, Cl. 138-172.000.
Rush, James B.; Bryan, James S.; Henry, Pearison W.; and Trantham, Richardson J., 4,966,741, Cl. 264-154.000.

De La Rosa, Loren M.: *See*—
Tremaine, Shawn A.; and De La Rosa, Loren M., 4,966,405, Cl. 296-95.100.

Debbas, Elie. Apparatus for locating a breast mass. 4,966,583, Cl. 604-98.000.

De Boer, Jan: *See*—
Ankenbauer, Gerhard; Bayer, Oswald; De Boer, Jan; and Rasp, Thomas, 4,966,475, Cl. 384-584.000.

De Campos, Hugo N., to Allied-Signal Inc. Timing control for a dual poppet valve. 4,966,193, Cl. 137-625.350.

Dechambeau, Scott A.; Torkelson, Robert; and Thompson, David. Safety cover for automotive service pits. 4,966,217, Cl. 160-35.000.

Deckers, Hellmuth: *See*—
Cherdron, Harald; Deckers, Hellmuth; Herold, Friedrich; and Hess, Reiner, 4,966,955, Cl. 528-183.000.

Dee Howard Company, The: *See*—
Fage, Etienne; and Lair, Jean-Pierre, 4,966,327, Cl. 239-265.290.

Defendorf, James: *See*—
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,966,458, Cl. 356-328.000.

DeGonia, David J.; and Griffin, Paul G., to Ethyl Petroleum Additives, Inc. Oil soluble sulfurized olefins and two temperature zone process for their preparation. 4,966,720, Cl. 252-45.000.

Degott, Pierre: *See*—
Amon, Albert; Bleikolm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, 4,966,628, Cl. 106-30.000.

Deguchi, Haruhiko: *See*—
Nakamura, Tsuneo; Imae, Kazuyoshi; Deguchi, Haruhiko; and Kira, Tohru, 4,966,648, Cl. 156-643.000.

Deguchi, Masashi: *See*—
Kiyohara, Tokuzo; and Deguchi, Masashi, 4,967,338, Cl. 364-200.000.

de Guillebon, Hubert, to Casutchouc Manufacture et Plastiques. Internal combustion engine. 4,966,571, Cl. 474-111.000.

Degussa Aktiengesellschaft: *See*—
Ahsan, M. Quamrul; Griffiths, Andrew; Haug, Ernest; and Norcross, Roy, 4,966,715, Cl. 210-721.000.
Giray, Guenes; Huthmacher, Klaus; Kleemann, Axel; and Lied, Thomas, 4,966,732, Cl. 260-399.000.

Deines, Alvin: *See*—
Farnsworth, Richard; Deines, Donald; and Deines, Alvin, 4,965,984, Cl. 53-444.000.

Deines, Donald: *See*—
Farnsworth, Richard; Deines, Donald; and Deines, Alvin, 4,965,984, Cl. 53-444.000.

Deininger, Anton: *See*—
Aschberger, Matthias; Farber, Karlheinz; and Deininger, Anton, 4,966,232, Cl. 165-169.000.

De Jong, Franciscus G. M.: *See*—
Sauerwald, Wilhelm A.; Osseyran, Anwar; Eerenstein, Lars A. R.; and De Jong, Franciscus G. M., 4,967,142, Cl. 324-73.100.

Delannoy, Francis; and Letray, Gerard. Process for separating ethylene oxide from aldehyde impurities by distillation. 4,966,657, Cl. 203-76.000.

Delhaes, Pierre: *See*—
Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, 4,966,729, Cl. 252-511.000.

Dell'Acqua, Roberto, to Marelli Autronica S.p.A. Electrical force and/or deformation sensor, particularly for use as a pressure sensor. 4,966,039, Cl. 73-727.000.

Deller, Andrew L.: *See*—
Colsen, Ronnie; Kairis, Alexander; and Deller, Andrew L., 4,966,164, Cl. 128-789.000.

DeLong, Edward A.; and Ritchie, George S. Method for fractionation of lignins from steam exploded lignocellulosics to provide fractions with different properties. 4,966,650, Cl. 162-14.000.

DeLuca, Hector F.; Kutner, Andrzej; and Schnoes, Heinrich K., to Wisconsin Alumni Research Foundation. Method for preparing all-trans retinoyl CoA. 4,966,965, Cl. 536-27.000.

Den-Tal-Ez, Inc.: *See*—
Gonser, Donald L., 4,966,552, Cl. 433-132.000.

DeNeale, Richard J.: *See*—
Michelucci, John J.; Sherman, Deborah M.; and DeNeale, Richard J., 4,966,768, Cl. 424-468.000.

Deneke, Ulfert; Guthlein, Werner; Weckerle, Wolfgang; and Wielinger, Hans, to Boehringer Mannheim GmbH. New redox indicators. 4,966,855, Cl. 436-66.000.
Denisevich, Peter, Jr.: *See*—
Schinski, William L.; and Denisevich, Peter, Jr., 4,966,988, Cl. 558-342.000.
Dentsply Research & Development Corp.: *See*—
Huang, Chin-Teh; and Blackwell, Gordon B., 4,966,934, Cl. 524-315.000.
De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., to Agfa-Gevaert, N.V. Photographic processing cassette. 4,967,221, Cl. 354-318.000.
Dereims, Philippe: *See*—
Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, 4,966,618, Cl. 65-106.000.
De Rycke, Gino L.: *See*—
De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 4,967,221, Cl. 354-318.000.
DeSantis, Eugene; and Bloom, Mitchell, to DeSantis, Eugene. Simulated pouch with interior, concealed holster. 4,966,320, Cl. 224-229.000.
Deserno, Ulrich: *See*—
Droegemueller, Karsten; Mayerhofer, Franz; Klement, Ekkehard; and Deserno, Ulrich, 4,966,444, Cl. 350-376.000.
Deshmukh, Abdul R. A. S.; Bhawal, Baburao M.; Shiralkar, Vasudeo P.; and Rajappa, Srinivasachari, to Council of Scientific & Industrial Research. Improved process for the preparation of 1-substituted amino-1-substituted thio-2-nitro alkenes. 4,967,007, Cl. 564-501.000.
Design Specialties Laboratories: *See*—
Lennox, James J., 4,966,593, Cl. 604-198.000.
Desitin Arznemittel GmbH: *See*—
Schafer, Helmut, 4,966,996, Cl. 562-598.000.
Desjouis, Francis: *See*—
Quievy, Didier; and Desjouis, Francis, 4,967,160, Cl. 328-16.000.
De Suarez D'Aulan, Henri F. L. H. System for mounting accessories on inflatable structures such as boats. 4,966,091, Cl. 114-345.000.
Deutch, Alan H.; and David, Victor A., to W. R. Grace & Co.-Conn. Molecular cloning and expression of a vibrio proteolyticus neutral protease gene. 4,966,846, Cl. 435-172.300.
Deutsche Institute fur Textil- und Faserforschung Stuttgart Stiftung des Offentlichenrechts: *See*—
Artunc, Hulusi; Egbers, Gerhard; Weinsdorfer, Helmut; and Wolfrum, Jurgen, 4,965,916, Cl. 28-271.000.
Devic, Michel, to Atochem. Process for the cyclization of orthobenzoylbenzoic acid. 4,966,984, Cl. 552-208.000.
Devroy, Craig A.: *See*—
Sorensen, B. Chuck; and Devroy, Craig A., 4,967,130, Cl. 318-652.000.
Dhyanchand, John: *See*—
Cook, Alexander; Dhyanchand, John; Palaniappan, Rasappa; and Schmitt, Dwight, 4,967,334, Cl. 363-34.000.
Diaz, Randall J.: *See*—
Ferchau, Joerg U.; Pham, Hoa V.; and Diaz, Randall J., 4,967,311, Cl. 361-395.000.
Di Camillo, John. Portable apparatus for processing marble tile. 4,965,964, Cl. 51-47.000.
Dichter, Anna Dichter and Wilhelm, heirs: *See*—
Horowitz, Carl; Sanduja, Mohan; and Dichter, Michael, deceased, 4,966,872, Cl. 502-7.000.
Dichter, Michael, deceased: *See*—
Horowitz, Carl; Sanduja, Mohan; and Dichter, Michael, deceased, 4,966,872, Cl. 502-7.000.
Didden, William S.: *See*—
Pelham, Anthony J.; Steiner, Walter R.; and Didden, William S., 4,967,375, Cl. 364-518.000.
Didier-Werke AG: *See*—
Bruckner, Raimund; and Gimpera, Jose , 4,966,314, Cl. 222-598.000.
Diemer, John W.; and Teagardin, Michael D., to Sundstrand Corporation. Cross-start bus configuration for a variable speed constant frequency electric power system. 4,967,096, Cl. 307-19.000.
Diesel Kiki Co., Ltd.: *See*—
Iida, Katsumi, 4,966,011, Cl. 62-179.000.
Iida, Katsumi, 4,966,012, Cl. 62-180.000.
Dieterich, Charles B., to General Electric Company. Widescreen television signal processor system with interpolator for reducing artifacts. 4,967,263, Cl. 358-11.000.
Dieul, Jean Henri L., to Bronzavia Air Equipment. Reflecting screen, its manufacturing method and its application to heat-insulation device. 4,966,425, Cl. 350-1.700.
Di Giovanni, Patrick: *See*—
Lina, Jean-Pierre; and Di Giovanni, Patrick, 4,966,535, Cl. 417-553.000.
Digital Equipment Corporation: *See*—
Hamburgen, William R., 4,966,226, Cl. 165-104.260.
Dikken, Jan; and Salters, Roelof H. W., to U.S. Philips Corp. Integrated logic circuit with protector transistor. 4,967,103, Cl. 307-296.500.
Dinol International Aktiebolag: *See*—
Tomaschek, Heinz A.; and Perlik, Helmuth, 4,966,936, Cl. 524-425.000.
Director General of Agency of Industrial Science and Technology: *See*—
Maeda, Akira; Yoshimura, Masahiko; and Hashimoto, Satoru, 4,967,350, Cl. 364-200.000.
Dirksing, Robert S.: *See*—
Hargraves, Peter J.; Dirksing, Robert S.; and Merz, Theodore P., 4,966,780, Cl. 426-118.000.
Disctronics Manufacturing, Inc.: *See*—
Nomula, Ram R.; Hamersley, Alan B.; and Rudd, Gordon, 4,967,286, Cl. 358-342.000.
DiStefano, Salvador: *See*—
Bugga, Ratnakumar V.; DiStefano, Salvador; Williams, Roger M.; and Bankston, Clyde P., 4,966,823, Cl. 429-104.000.
Distinctively Different, Inc.: *See*—
Paschal, Richard C., 4,967,320, Cl. 362-96.000.
Diversey Corporation: *See*—
Lavelle, Grant E., 4,966,182, Cl. 137-1.000.
Dixon, John W.: *See*—
Bowles, William B.; and Bowles, Margaret A., 4,966,537, Cl. 425-87.000.
Doan, Alpha N.; and Parkhurst, Anthony D., to Hewlett-Packard Company. Interlace printing process. 4,967,203, Cl. 346-1.100.
Dr. Ing. H.c.F. Porsche Aktiengesellschaft: *See*—
Pfister, Klaus, 4,966,245, Cl. 180-68.600.
Rispeter, Siegfried; Muller, Hubert; and Wust, Rainer, 4,966,270, Cl. 192-87.150.
Doemens, Guenter; and Rose, Thomas, to Siemens Aktiengesellschaft. Apparatus for electrical function testing of wiring matrices, particularly of printed circuit boards. 4,967,148, Cl. 324-158.00F.
Doemens, Guenter; Rose, Thomas; Hoffmann, Detlef; and Heisen, Arnold, to Siemens Aktiengesellschaft. Drive device for an apparatus for electrical function testing of wiring matrices. 4,967,149, Cl. 324-158.00F.
Doenges, Reinhard; Ruckert, Hans; Geissler, Ulrich; and Steppan, Hartmut, to Hoechst Aktiengesellschaft. Carbonylmethylene-meterocyclic compounds containing trihalogenomethyl groups, process for their preparation, and light-sensitive mixture containing the compounds. 4,966,828, Cl. 430-281.000.
Doerper, Thomas: *See*—
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, 4,966,894, Cl. 514-56.000.
Dogen, Masayuki: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Dohi, Hideyuki: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,967,028, Cl. 585-6.300.
Dohi, Hikoo, to Yazaki Corporation. Crimp-style terminal and method of connecting crimp-style terminal and electric cable together. 4,966,565, Cl. 439-874.000.
Domen, Albrecht F.: *See*—
De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 4,967,221, Cl. 354-318.000.
Domigan, Charles N.; and Harmon, J. David, to Butler Manufacturing Company. Combined deck unit and cellular raceway. 4,965,972, Cl. 52-221.000.
Dominguez, Danilo A.; and Flores, James F. Articulated multi-unit hopper railway car. 4,966,081, Cl. 105-4.100.
Donahue, Raymond J.: *See*—
Hesterberg, William G.; Donahue, Raymond J.; and Cleary, Terrance M., 4,966,220, Cl. 164-34.000.
Donofrio, Deborah K.; and Whitekettle, Wilson K., to Betz Laboratories. Biocidal compositions and use thereof. 4,966,775, Cl. 424-661.000.
Donohue, Paul C., to Du Pont de Nemours, E. I., and Company. Encapsulant composition. 4,966,926, Cl. 523-210.000.
Doran, Robert W.: *See*—
Lent, Robert S.; Willis, Arthur C.; and Doran, Robert W., 4,967,342, Cl. 364-200.000.
Dornes, John. Music synthesizer with multiple movable bars. 4,966,053, Cl. 84-718.000.
Doty, Robert W. Food and beverage snack tray. 4,966,297, Cl. 220-23.830.
Dougherty, John J., to General Electric Company. Digital circuit interrupter with electric motor trip parameters. 4,967,304, Cl. 361-31.000.
Doumas, William M.: *See*—
Colby, Ralph S.; Doumas, William M.; Fouere, Jean-Claude; and Rectenwald, Robert M., 4,967,211, Cl. 346-160.000.
Dow Chemical Company, The: *See*—
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., 4,966,810, Cl. 428-335.000.
Dow Corning Corporation: *See*—
Halm, Roland L.; and Zapp, Regie H., 4,966,986, Cl. 556-473.000.
Downs, John D.: *See*—
Larrivee, Ronald J.; and Downs, John D., 4,965,979, Cl. 52-585.000.
DP Tek, Inc.: *See*—
Frazier, Allen L., 4,967,210, Cl. 346-150.000.
Draenert, Klaus. Evacuatable bone cement syringe. 4,966,601, Cl. 606-92.000.
Drake, John E., Jr.: *See*—
Clarke, Kathryn E.; Drake, John E., Jr.; Pozefsky, Diane P.; and Siddall, William E., 4,967,345, Cl. 364-200.000.
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., to Schering AG. Coating method using aqueous glycidyl compound-amine hardner-thermoplastic resin compositions. 4,966,945, Cl. 525-113.000.
Dressen, Larry: *See*—
Gregerson, Barry; and Dressen, Larry, 4,966,284, Cl. 206-444.000.
Dresser Industries, Inc.: *See*—
Giles, Gary J., 4,966,184, Cl. 137-205.500.

Drever, Leslie C. Microphone windscreen and method of fabricating the same. 4,966,252, Cl. 181-158.00
Driggers, Robert H.; and Stevenson, David E. Guitar support apparatus. 4,966,062, Cl. 84-327.000.
Driscoll Strawberry Associates, Inc.: *See*—
Show, Edgar D., 4,966,329, Cl. 239-650.000.
Droegemueller, Karsten; Mayerhofer, Franz; Klement, Ekkehard; and Deserno, Ulrich, to Siemens Aktiengesellschaft. Feedback-free optical arrangement for converting polarized laser emissions into a convergent beam. 4,966,444, Cl. 350-376.000.
Drori, Mordeki. Multiple-disc type filters. 4,966,702, Cl. 210-448.000.
Du Pont Canada Inc.: *See*—
Sipos, Peter A.; and Besso, Erica M., 4,966,960, Cl. 528-335.000.
DuBois, Arthur E. Reflective stick. 4,967,322, Cl. 362-102.000.
Duc, Laurent, to Lonza Ltd. Process for the production of 4-chloro-3-alkoxy-but-2E-enoic acid alkyl esters. 4,966,989, Cl. 560-183.000.
Ducrot, Christian: *See*—
Canitrot, Didier; Ducrot, Christian; and Terasse, Jean-Francois, 4,967,137, Cl. 322-7.000.
Duda, Eugene: *See*—
Mouchart, Jacques; Begel, Jacqueline; and Duda, Eugene, 4,966,438, Cl. 350-173.000.
Duer, Mark G.: *See*—
Campbell, Robert M.; and Duer, Mark G., 4,965,955, Cl. 43-4.000.
Duke University: *See*—
Shields, M. Bruce; and Erickson, Phillip J., 4,966,452, Cl. 351-219.000.
Dulzo, Jeffrey J.: *See*—
Lusch, Robert F.; and Dulzo, Jeffrey J., 4,967,414, Cl. 371-51.100.
Dumas, Jerome E.; Harris, Eric W., Jr.; and MacDougal, John G., to Research Equipment Corporation. Method and apparatus for particle concentration detection using a cloud chamber. 4,967,187, Cl. 340-628.000.
Dungan, Dennis F.: *See*—
Micheli, Adolph L.; and Dungan, Dennis F., 4,966,875, Cl. 501-152.000.
Dunn, Steven E.: *See*—
Fernando, Tissa; and Dunn, Steven E., 4,966,733, Cl. 260-412.600.
Du Pont de Nemours, E. I., and Company: *See*—
Chern, Terry S., 4,966,017, Cl. 68-5.00C.
Clement, Robert A.; Tam, Wilson; and Wang, Ying, 4,966,730, Cl. 252-589.000.
Donohue, Paul C., 4,966,926, Cl. 523-210.000.
Gumprecht, William H.; Schindel, Wesley G.; and Felix, Vinci M., 4,967,024, Cl. 570-168.000.
Hung, Ming-Hong, 4,967,022, Cl. 570-136.000.
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,966,914, Cl. 514-461.000.
Reese, Cecil E., 4,966,740, Cl. 264-103.000.
Subramanian, Pallatheri M., 4,966,941, Cl. 525-66.000.
Wang, Teh-Chuan, 4,966,950, Cl. 525-444.000.
Wheland, Robert C., 4,966,949, Cl. 525-420.000.
Durance, Timothy; Li-Chan, Eunice; and Nakai, Shuryo, to University of British Columbia, The. Process for isolation of lysozyme and avidin from egg white. 4,966,851, Cl. 435-206.000.
Durousseau, Donald: *See*—
Gevins, Alan S.; Durousseau, Donald; and Libove, Joel, 4,967,038, Cl. 128-644.000.
Durr, Dieter: *See*—
Rempfler, Hermann; Durr, Dieter; and Thummel, Rudolf C., 4,966,622, Cl. 71-92.000.
Dutka, Charlotte. Shopping organizer device. 4,966,318, Cl. 224-42.46R.
Dutro, Scott G.; and Dutro, Terry D. Extension glide system for mounting truck storage box. 4,966,401, Cl. 296-37.600.
Dutro, Terry D.: *See*—
Dutro, Scott G.; and Dutro, Terry D., 4,966,401, Cl. 296-37.600.
Dye, John F., to Kendall Company. Connection device. 4,966,396, Cl. 285-136.000.
Dyke, Harry J.; and Rattan, Dev R., to Rockwell International Corporation. Digital loop carrier system having CPU to channel unit protocol. 4,967,193, Cl. 340-825.030.
Dykes, Robert M.: *See*—
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,965,910, Cl. 17-49.000.
Dynamit Nobel Aktiengesellschaft: *See*—
Poyda, Frank, 4,966,492, Cl. 405-128.000.
Dynatherm Systems U.S.A. Ltd.: *See*—
Nania, Daniela, 4,965,970, Cl. 52-82.000.
E-Systems, Inc.: *See*—
Dawes, Robert L., 4,967,340, Cl. 364-200.000.
Eastern Kodak Company: *See*—
Cox, Abraham J.; and Meyer, Max F., Jr., 4,966,959, Cl. 528-272.000.
Eastman Kodak Company: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,085, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,087, Cl. 250-483.100.
D'Ambrosia, George C.; and Ludden, Christopher A., 4,967,183, Cl. 340-552.000.
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,966,947, Cl. 525-327.600.
Horton, Robert L.; and Backus, Richard J., 4,967,094, Cl. 250-561.000.
Matoushek, Robert J., 4,966,464, Cl. 346-76.0PH.
Mehra, Madhay; and Weiss, Armin K., 4,966,831, Cl. 430-321.000.
Moore, Christopher P.; and Thomason, Derek A., 4,966,678, Cl. 204-418.000.
Orlicki, David M.; and Fearnside, William T., 4,967,404, Cl. 369-44.110.
Parulski, Kenneth A.; Nutting, Thomas C.; and Moore, Leslie G., 4,967,264, Cl. 358-44.000.
Regelsberger, Matthias H., 4,967,184, Cl. 340-572.000.
Rodenberg, Orville C.; Mey, William; Paczkowski, Francis M.; and Leone, Salvatore, 4,967,236, Cl. 355-272.000.
White, Alan W., 4,966,917, Cl. 514-616.000.
Eaton Corporation: *See*—
Braun, Eugene R., 4,966,048, Cl. 74-745.000.
Janson, David A.; Glinski, Jerome V., Jr.; and Preston, David M., 4,966,246, Cl. 180-140.000.
Killarney, Declan E., 4,967,043, Cl. 200-1.00B.
Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 4,967,362, Cl. 364-424.070.
Tatavoosian, Vanacan, 4,967,328, Cl. 362-267.000.
Tatavoosian, Vanacan; and Schaeffer, George E., 4,967,329, Cl. 362-267.000.
Ecalle, Olivier; and Vinckx, Valery, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for the annealing treatment of metal strips. 4,966,632, Cl. 148-16.000.
Eckenhoff, James B., to ALZA Corporation. Ruminant dispensing device comprising agent displacement member. 4,966,767, Cl. 424-438.000.
Eckhardt, Heinz: *See*—
Karcher, Michael; Eckhardt, Heinz; and Henkelmann, Jochem, 4,967,015, Cl. 568-616.000.
Eckhardt, Wolfgang; Meyer, Alfred; and Kunz, Walter, to Ciba-Geigy Corporation. Isonicotinic acid amides for protecting plants against disease. 4,966,908, Cl. 514-340.000.
Ecological Systems Technology, L.P.: *See*—
Adey, Walter H., 4,966,096, Cl. 119-3.000.
Edelhauser, Henry F.: *See*—
Gressel, Philip D.; Roehrs, Robert E.; Ubels, John L.; and Edelhauser, Henry F., 4,966,773, Cl. 424-489.000.
Edens, Luppo: *See*—
Verrips, Cornelis T.; Maat, Jan; Edens, Luppo; and Ledeboer, Adrianus M., 4,966,842, Cl. 435-69.100.
Edgar, Jon M.: *See*—
Cowell, Wiley M.; Malmberg, Quentin C.; and Edgar, Jon M., 4,966,005, Cl. 62-79.000.
Edmond, John A., to Cree Research, Inc. Method of production of light emitting diodes. 4,966,862, Cl. 437-100.000.
Edwards, Byron, to Ford Aerospace Corporation. Integrated reticle and detector. 4,967,065, Cl. 250-203.600.
Eerenstein, Lars A. R.: *See*—
Sauerwald, Wilhelm A.; Osseyran, Anwar; Eerenstein, Lars A. R.; and De Jong, Franciscus G. M., 4,967,142, Cl. 324-73.100.
Egbers, Gerhard: *See*—
Artunc, Hulusi; Egbers, Gerhard; Weinsdorfer, Helmut; and Wolfrum, Jurgen, 4,965,916, Cl. 28-271.000.
Eggenberger, Jean-Albert. Snowboard simulator. 4,966,364, Cl. 272-111.000.
Ehrich, Hans-Jurgen; and Mahlkow, Hartmut, to Schering Aktiengesellschaft. Conditioning means for printed circuits. 4,966,786, Cl. 427-97.000.
Eichhorn, Anthony E., to Quaker Oats Company, The. Tent movable between a collapsed position and a latched erect position. 4,966,178, Cl. 135-104.000.
Eidam, Helmut: *See*—
Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, 4,966,739, Cl. 264-87.000.
Eilon Ginsburg, to COMFUTURE, Visual Information Management Systems. Multi-colored dot display device. 4,967,373, Cl. 364-518.000.
Ejchler, Henry; and Jones, Derrell G., to Caterpillar Inc. Vehicle for manipulating pipe. 4,966,290, Cl. 212-258.000.
Electric Co., Ltd.: *See*—
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.
Electric Power Research Institute, Inc.: *See*—
Pawlak, Wanda; Janiak, Jerzy S.; Turak, Ali A.; and Ignasiak, Boleslaw L., 4,966,608, Cl. 44-624.000.
Elixir Industries: *See*—
Cook, Donald W., 4,966,378, Cl. 280-154.000.
Ellingboe, John W.; Bagli, Jehan F.; and Alessi, Thomas R., to American Home Product. Processes for the preparation of novel naphthalenylmethyl-3H-1,2,3,5-oxathiadiazole 2-oxides useful as antihyperglycemic agents. 4,966,975, Cl. 548-122.000.
Ellis-Brown, Roy, to International Seafood Engineering, Inc. Shrimp cooking apparatus. 4,966,072, Cl. 99-443.00C.
Ellis, Lamar. In-line molecular sieve bed conversion kit. 4,965,989, Cl. 55-162.000.
Elscint Ltd.: *See*—
Stokar, Saul, 4,966,149, Cl. 128-653.00A.
Emhart Industries, Inc.: *See*—
Speer, Gregg V.; Ray, Donald L.; and Petre, Mark L., 4,967,044, Cl. 200-4.000.
Empak, Inc.: *See*—
Gregerson, Barry; and Dressen, Larry, 4,966,284, Cl. 206-444.000.

Emrich, Robert K., to ESCO Corporation. Excavating tooth. 4,965,945, Cl. 37-142.00R.
Enchev, Ivan D.; Starev, Lyuben R.; Illel, Eliezer P.; and Korudanov, Georgi N., to Institute Po Tzvetna Metalurgia. Method and apparatus for electric refining of lead. 4,966,624, Cl. 75-10.650.
Endo, Hiroyuki: *See*—
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.
Endo, Keiji: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,967,028, Cl. 585-6.300.
Endo, Mitsuharu: *See*—
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoii, to Toyota Jidosha Kabushiki Kaisha. Suspension member mounting structure. 4,966,384, Cl. 280-688.000.
Energia Andina Ltd.: *See*—
Miller, Jorge P.; and Kling, Miguel F., 4,967,034, Cl. 585-446.000.
Engebretsen, Arne. Devices for load carrying structures. 4,965,973, Cl. 52-223.00R.
Engel, Alan K., to Research Development Corporation of Japan, a part interest. Process for making ultrathin polymeric imine films. 4,966,743, Cl. 264-298.000.
Engelhardt, John A.; and Tarr, Richard R., to Boehringer Mannheim Corporation. Power broach system. 4,966,509, Cl. 409-281.000.
English, Roe E.; Kilgore, Michael A.; and Crone, Jerry A., to Texas Instruments Incorporated. Automated diagnostic system. 4,967,337, Cl. 364-184.000.
Enniss, James P.: *See*—
Callinan, Kevin M.; and Enniss, James P., 4,966,609, Cl. 51-295.000.
Enoguchi, Yuji: *See*—
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.
Epton, David J.: *See*—
Hutcheon, Ian C.; and Epton, David J., 4,967,302, Cl. 361-1.000.
Equiepments Electroques Moteur: *See*—
Canitrot, Didier; Ducrot, Christian; and Terasse, Jean-Francois, 4,967,137, Cl. 322-7.000.
Erhardt, Werner, to Siemens Aktiengesellschaft. Break-away element for electrical capacitor. 4,967,310, Cl. 361-275.000.
Erickson, Donald C. Solar absorption refrigeration. 4,966,014, Cl. 62-235.100.
Erickson, Phillip J.: *See*—
Shields, M. Bruce; and Erickson, Phillip J., 4,966,452, Cl. 351-219.000.
Eriksson, Lars-Olov; and Sundstrom, Erik, to Sandvik AB. Laminated guidebar. 4,965,934, Cl. 30-387.000.
Erwin Sick GmbH Optik-Elektronik: *See*—
von Stein, Walter, 4,967,074, Cl. 250-236.000.
Esarco Limited: *See*—
Somerton-Rayner, Michael, 4,966,244, Cl. 180-24.090.
ESCO Corporation: *See*—
Emrich, Robert K., 4,965,945, Cl. 37-142.00R.
Esterowitz, Leon; and Allen, Roger E., to United States of America, Navy. Thulium-doped fluorozirconate fiber laser pumped by a diode laser source. 4,967,416, Cl. 372-6.000.
Estigoy, Filemon E.; and Spector, George. Mini hydro electric plant. 4,965,998, Cl. 60-325.000.
Etablissement Nanicoba: *See*—
Bersier, Nicolas, 4,966,345, Cl. 248-354.300.
Ethyl Corporation: *See*—
Chang, Suae-Chen, 4,966,937, Cl. 524-538.000.
Smith, Kim R., 4,967,005, Cl. 564-475.000.
Ethyl Petroleum Additives, Inc.: *See*—
DeGonia, David J.; and Griffin, Paul G., 4,966,720, Cl. 252-45.000.
Etienne, Jean-Daniel; Farine, Pierre-Andre ; and Bornoz, Claude, to Asulab S.A. Echo tracking system for apparatus for ultrasonic measurement of the position of a mobile wall. 4,966,150, Cl. 128-661.040.
Etoh, Yoshiyuki, to Nissan Motor Company, Limited. System and method for automatically controlling a vehicle speed to a desired cruising speed. 4,967,358, Cl. 364-426.040.
Eumuco Aktiengesellschaft fur Maschinenbau: *See*—
Willenbrock, Walter; and Werner, Eberhard, 4,966,274, Cl. 198-621.000.
Europaische Atomgemeinschaft (EURATOM): *See*—
Werner, Paul; and Hiernaut, Jean-Pol, 4,966,737, Cl. 264-14.000.
Ewert, Alfred; and Kathmann, Franz, to Hella KG Hueck & Co. Vehicle headlight. 4,967,318, Cl. 362-61.000.
Exxon Chemical Patents Inc.: *See*—
Smith, Marvin F., Jr., 4,966,722, Cl. 252-56.00R.
Young, David A.; Jones, Larry O.; and Campione, Troy J., 4,966,874, Cl. 502-117.000.
Exxon Research & Engineering Company: *See*—
Baird, William C., Jr.; and Shoukry, Ehsan I., 4,966,682, Cl. 208-139.000.
Baird, William C., Jr., 4,966,878, Cl. 502-226.000.
Baird, William C., Jr., 4,966,879, Cl. 502-226.000.
Baird, William C., Jr.; Riley, Kenneth L.; and Swan, George A., III, 4,966,880, Cl. 502-242.000.
Baird, William C., Jr., 4,966,881, Cl. 502-252.000.
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; and Beltzer, Morton, 4,966,719, Cl. 252-42.700.
Ezawa, Hiroshi; Watanabe, Takayuki; Tsushima, Hiroaki; and Nishiba, Zyuzo, to Mitsui Toatsu Chemicals, Inc. Heat-shrinkable polystyrene-base foamed composite sheet. 4,966,805, Cl. 428-212.000.
F.I.A. Futurologie Industrielle Automation GmbH: *See*—
Aharon, Roni, 4,967,053, Cl. 219-121.780.
Fabri-Kal Corporation: *See*—
Mack, Anthony C.; and Robbins, Robin M., 4,966,294, Cl. 220-266.000.
FAG Kugelfischer Georg Schafer (KGaA): *See*—
Ankenbauer, Gerhard; Bayer, Oswald; De Boer, Jan; and Rasp, Thomas, 4,966,475, Cl. 384-584.000.
Fage, Etienne; and Lair, Jean-Pierre, to Dee Howard Company, The. Jet engine provided with a thrust reverser. 4,966,327, Cl. 239-265.290.
Fahrbach, Rudolf, to Universal manufacturing. Multi-spindle machine for winding wire on bobbins. 4,966,337, Cl. 242-7.090.
Fair, Martin L.; and Roberts, John C., to British Aerospace Public Limited Company. Reflective picture generator. 4,967,091, Cl. 250-504.00R.
Famcy Steel Corporation: *See*—
Wan, Chi-Meen, 4,966,636, Cl. 148-329.000.
Fang, Shou-Mean: *See*—
Horsma, David A.; Kamath, Hundi P.; and Fang, Shou-Mean, 4,967,176, Cl. 338-22.00R.
Fanuc Ltd.: *See*—
Hara, Ryuichi, 4,967,125, Cl. 318-568.110.
Inaba, Yoshiharu; and Kamiguchi, Masao, 4,966,738, Cl. 264-40.500.
Nakamura, Shigeo; and Yairo, Osamu, 4,967,101, Cl. 307-270.000.
Yamazaki, Etuo; and Matsuura, Hitoshi, 4,967,364, Cl. 364-474.030.
Fanuc Ltd: *See*—
Obara, Haruki; and Izumiya, Syunzo, 4,967,054, Cl. 219-69.130.
Farber, Karlheinz: *See*—
Aschberger, Matthias; Farber, Karlheinz; and Deininger, Anton, 4,966,232, Cl. 165-169.000.
Farbood, Mohamad I.: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,966,783, Cl. 426-565.000.
Farine, Pierre-Andre : *See*—
Etienne, Jean-Daniel; Farine, Pierre-Andre ; and Bornoz, Claude, 4,966,150, Cl. 128-661.040.
Farng, Liehpao O.; and Horodysky, Andrew G., to Mobil Oil Corporation. N-N'-dihydrocarbyl substituted phenylene diamine-derived condensation products as antioxidants and lubricant compositions. 4,966,721, Cl. 252-51.50R.
Farnsworth, Richard; Deines, Donald; and Deines, Alvin, to Package Machinery Corporation. Method and apparatus for aligning elongated articles. 4,965,984, Cl. 53-444.000.
Farnsworth, Warren M., to Micron Technology, Inc. Gull-wing zig-zag inline lead package having end-of-package anchoring pins. 4,967,262, Cl. 357-80.000.
Faroudja, Ives C.: *See*—
Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., 4,967,271, Cl. 358-105.000.
Faroudja, Yves C.: *See*—
Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., 4,967,271, Cl. 358-105.000.
Farr, Andrew G.: *See*—
Clark, John I.; Farr, Andrew G.; and Smith, Stacia A., 4,966,911, Cl. 514-385.000.
Farr, Glyn P. R., to Lucas Industries public limited company. Traction control system. 4,966,248, Cl. 180-197.000.
Farrell, Leslie A. Integrated food tray with individual separable food containers for heating and cooling food. 4,966,296, Cl. 220-23.400.
Fast, Jacob; and Fast, Robert. Label holder attachments for product information display tags. 4,965,949, Cl. 40-642.000.
Fast, Robert: *See*—
Fast, Jacob; and Fast, Robert, 4,965,949, Cl. 40-642.000.
Favstritsky, Nicolai A.; Hein, Arthur J.; and Squires, Glade E., to Great Lakes Chemical Corporation. Method for the control of biofouling in recirculating water systems. 4,966,716, Cl. 210-755.000.
Favstritsky, Nicolai A.; and Mamuzic, Rastko I., to Great Lakes Chemical Corporation. Block copolymer of polyalkylene and halogenated polystyrene. 4,966,946, Cl. 525-314.000.
Fawcett, Sherwood L., to Sedum Corporation. Regenerative gas-to-gas heat exchanger. 4,966,228, Cl. 165-4.000.
Fearnside, William T.: *See*—
Orlicki, David M.; and Fearnside, William T., 4,967,404, Cl. 369-44.110.
Featon, Robert J.; Fowler, James W.; and Miles, Barry J., to Australian Mobile Tech Corporation Pty. Ltd.; and Freight Lok Pty. Ltd. Wheelchair and occupant restraints. 4,966,392, Cl. 280-801.000.
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I. Method of sterilizing anthers. 4,966,756, Cl. 422-37.000.
Feikema, Roger H. Adult tricycle. 4,966,381, Cl. 280-261.000.
Feldman, Alfred P., to United States of America, Health and Human Services. Automatic orientation and interactive addressing of display. 4,967,372, Cl. 364-518.000.
Felix, Vinci M.: *See*—
Gumprecht, William H.; Schindel, Wesley G.; and Felix, Vinci M., 4,967,024, Cl. 570-168.000.
Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., to American Home Products Corporation. Anti-ulcer 5-(2-substituted ethenyl)-3-(2H)-furanones. 4,966,905, Cl. 514-314.000.

Feltkamp, Heinrich: *See—*
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, 4,966,772, Cl. 424-482.000.
Fengsheng, Lu. All dry submersible motor pump with a concordant seal system. 4,966,532, Cl. 417-366.000.
Fenton, Dennis M.: *See—*
Tallen, Michael J.; and Fenton, Dennis M., 4,966,844, Cl. 435-71.200.
Ferchau, Joerg U.; Pham, Hoa V.; and Diaz, Randall J., to Tandem Computers Incorporated. Electronic module interconnection system. 4,967,311, Cl. 361-395.000.
Ferguson, John H. Bobbin stripping system. 4,965,917, Cl. 28-295.300.
Ferlauto, Robert J., Jr.: *See—*
Gaffab, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,966,777, Cl. 424-52.000.
Fernando, Tissa; and Dunn, Steven E., to Meat Industry Research Institute of New Zealand, The. Rendering processes. 4,966,733, Cl. 260-412.600.
Ferrua, Bernard; and Moulin, Claude, to Compagnie Oris Industrie S.A. Process for the immunological quantitative determination of T3 and/or T4 thyroid hormones, using thyroglobulin. 4,966,838, Cl. 435-7.000.
Feuerherd, Karl-Heinz: *See—*
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.
Fiat Auto S.p.A.: *See—*
Raviglione, Cesare; and Rubino, Paolo, 4,967,143, Cl. 324-73.100.
Ficht GmbH: *See—*
Ficht, Reinhold; and Hamann, Lutz, 4,966,068, Cl. 92-193.000.
Ficht, Reinhold; and Hamann, Lutz, to Ficht GmbH. Split ceramic piston ring arrangement with nested biasing ring. 4,966,068, Cl. 92-193.000.
Fichtel & Sachs AG: *See—*
Asthammer, Ladwig, 4,966,257, Cl. 188-322.170.
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittenbring, Gerhard, 4,966,269, Cl. 192-70.160.
Field, Bruce F.; and Hunt, Paul C., to Tennant Company. Method and apparatus for a target determining apparatus having increased range. 4,967,064, Cl. 250-203.200.
Filtertek, Inc.: *See—*
Ruschke, Ricky R., 4,966,199, Cl. 137-843.000.
Firmenich S.A.: *See—*
Mahaim, Cyril, 4,967,033, Cl. 585-358.000.
First Brands Corporation: *See—*
Landeck, Harry A., 4,966,059, Cl. 83-53.000.
Fischer, Morgan F. Spring hinge assembly for toilet seats. 4,965,890, Cl. 4-240.000.
Fischer, Rudolf; and Gartner, Josef, to Regal + Meastechnik GmbH. Pneumatically operated gas-pressure controller. 4,966,188, Cl. 137-489.000.
Fischer, William C., Jr.: *See—*
Amelio, Armand F.; and Fischer, William C., Jr., 4,966,526, Cl. 416-90.00R.
Fithian, Michael J.; and Foster, James E., to Ball Corporation. Structure for use in self-biasing and source bypassing a packaged, field-effect transistor and method for making same. 4,967,258, Cl. 357-51.000.
Fitzpatrick, Donald C.: *See—*
Frye, Kenneth G.; Fitzpatrick, Donald C.; and Grody, Donald R., 4,966,521, Cl. 414-788.800.
Fleming, James E., to Linus Pauling Institute of Science and Medicine. Novel radio labelled dye composition for detecting proteins in gels. 4,966,854, Cl. 436-57.000.
Fleming, Jim, to Jim Fleming Communications. Orthodontal device carrying case with neck strap. 4,966,319, Cl. 224-207.000.
Flint & Walling, Inc.: *See—*
Overy, Douglas E., 4,966,692, Cl. 210-123.000.
Flores, James F.: *See—*
Dominguez, Danilo A.; and Flores, James F., 4,966,081, Cl. 105-4.100.
FM Industries, Inc.: *See—*
St. Louis, Paul T., 4,966,499, Cl. 405-271.000.
FMC Corporation: *See—*
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,965,993, Cl. 56-327.100.
Keys, Daniel W.; and Burgin, Grady W., 4,966,713, Cl. 210-705.000.
Pfeffer, Henry A.; and Hills, William A., 4,966,762, Cl. 423-415.00P.
Foa, Marco: *See—*
Casagrande, Francesco; Foa, Marco; Gardano, Andrea; and Chapoy, L. Lawrence, 4,966,957, Cl. 528-193.000.
Fobelmac Consulting AG: *See—*
Nuttin, Pierre, 4,966,352, Cl. 270-1.100.
Focelle, Dennis M.; and Hanlon, Terrance W., to RMS Company. Aneurysm clip. 4,966,603, Cl. 606-158.000.
Folkertsma, John M. Wallet with detachable billfold. 4,966,210, Cl. 150-138.000.
Foote, Roger M. L., to Telectronics, N.V. Electrical connector between electrode leads and pacemaker terminal. 4,966,564, Cl. 439-840.000.
Forbush, Donald C.: *See—*
Lewis, Richard A. J.; and Forbush, Donald C., 4,966,757, Cl. 422-62.000.
Ford Aerospace Corporation: *See—*
Edwards, Byron, 4,967,065, Cl. 250-203.600.
Gretz, Bruce D.; and Tilley, Scott W., 4,967,126, Cl. 318-568.190.
Ford Motor Company: *See—*
Jamoua, Saad A.; and Hoffman, Stephen W., 4,967,398, Cl. 365-230.050.
Schulz, Winfried; Kirchhoffer, Johann; and Graef, Kurt, 4,966,050, Cl. 74-867.000.
Forintek Canada Corp.: *See—*
Yu, Ernest K. C.; Tan, Larry U. L.; and Saddler, John N., 4,966,850, Cl. 435-200.000.
Fossum, Eric R., to Reliance Electric Industrial Company. Automatic wear compensator for electromagnetic brake. 4,966,255, Cl. 188-71.800.
Foster, Bobby D. Parking brake warning device for over the road tractor trailers. 4,967,182, Cl. 340-457.300.
Foster, James E.: *See—*
Fithian, Michael J.; and Foster, James E., 4,967,258, Cl. 357-51.000.
Foster Miller, Inc.: *See—*
Harvey, Andrew C.; Lusignea, Richard W.; and Racich, James L., 4,966,807, Cl. 428-220.000.
Lusignea, Richard W.; Stevenson, William S.; and McCoy, John F., III, 4,966,806, Cl. 428-220.000.
Foster Wheeler Energy Corporation: *See—*
Trozzi, Norman K., 4,966,471, Cl. 384-151.000.
Fotheringham, Robin H.: *See—*
Fotheringham, Scott M.; and Fotheringham, Robin H., 4,966,020, Cl. 70-276.000.
Fotheringham, Scott M.; and Fotheringham, Robin H., to 880335 Ontario Inc. Locking mechanism. 4,966,020, Cl. 70-276.000.
Foto-Wear, Inc.: *See—*
Hare, Donald S., 4,966,815, Cl. 428-497.000.
Fouere, Jean-Claude: *See—*
Colby, Ralph S.; Doumas, William M.; Fouere, Jean-Claude; and Rectenwald, Robert M., 4,967,211, Cl. 346-160.000.
Fournier, Jean; and Casariego, Adrian, to Societe Anonyme dite: Stein Industrie. Device for protecting screens in boilers, and in particular for garbage incinerators, and procedure for manufacture of this device. 4,966,100, Cl. 122-6.00A.
Fowler, James W.: *See—*
Featon, Robert J.; Fowler, James W.; and Miles, Barry J., 4,966,392, Cl. 280-801.000.
Fowlkes, Robert L., to Air Products and Chemicals, Inc. Alkylation of toluenediamine and para-phenylenediamine with isobutylene in the presence of acidic, crystalline molecular sieves. 4,967,001, Cl. 564-305.000.
Fraignier, Beraard; and Roger, Christian, to Societe Anonyme dite Hispano-Suiza. Apparatus for optically checking the inner profile of a tube or bore. 4,967,092, Cl. 250-560.000.
Frank, Paul D.: *See—*
Reid, James; Roberts, Gary E.; and Frank, Paul D., 4,967,300, Cl. 360-122.000.
Franks, James E.: *See—*
Billingham, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovsky, Alexander, 4,965,932, Cl. 29-861.000.
Fraser, David B.: *See—*
Murali, Venkatesan; Wei, Chih-Shih; and Fraser, David B., 4,966,868, Cl. 437-193.000.
Fraser, Douglas S.; and Thompson, Taylor N., Sr., to FTS Systems, Inc. Positioning device for temperature sensor in freeze drying. 4,966,469, Cl. 374-208.000.
Frazier, Allen L., to DP Tek, Inc. Dry transfer lettering system and method. 4,967,210, Cl. 346-150.000.
Freeman, Lamont L. Method of forming a game and pet feeder. 4,966,098, Cl. 119-52.200.
Freidin, Philip, to Advanced Micro Devices, Inc. Universal microprocessor interface circuit. 4,967,346, Cl. 364-200.000.
Freight Lok Pty. Ltd.: *See—*
Featon, Robert J.; Fowler, James W.; and Miles, Barry J., 4,966,392, Cl. 280-801.000.
Freisinger, Karl: *See—*
Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, 4,966,739, Cl. 264-87.000.
Fresenius AG: *See—*
Polaschegg, Hans-Dietrich, 4,966,579, Cl. 604-65.000.
Frey, Heinz. Crank drive. 4,966,043, Cl. 74-52.000.
Frisoli, Floyd E.; and Gilbert, Robert M., to Sherex Chemical Company, Inc. Polyamines and their preparation. 4,967,008, Cl. 564-512.000.
Friedrich, Klaus: *See—*
Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, 4,967,017, Cl. 568-621.000.
Fringeli, Eduard: *See—*
Luchinger, Paul; and Fringeli, Eduard, 4,966,241, Cl. 177-253.000.
Frinzel, Udo, to Siemens Aktiengesellschaft. Bypass throttle control for a motor vehicle. 4,966,122, Cl. 123-585.000.
Frisch, Martin, to Nestec S.A. Device for the preparation of beverages. 4,966,070, Cl. 99-302.00R.
Fritz, Gerhard: *See—*
Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, 4,967,013, Cl. 568-433.000.
Frueh, Richard P.: *See—*
Krauer, Alwin; and Frueh, Richard P., 4,966,047, Cl. 74-502.200.

Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., to Eastman Kodak Company. Modified chlorinated polyolefins. 4,966,947, Cl. 525-327.600.

Frye, Kenneth G.; Fitzpatrick, Donald C.; and Grody, Donald R., to Beloit Corporation. Tail stopping and knockdown device. 4,966,521, Cl. 414-788.800.

FTS Systems, Inc.: *See—*
Fraser, Douglas S.; and Thompson, Taylor N., Sr., 4,966,469, Cl. 374-208.000.

Fu, Yao A.: *See—*
Chang, Yin; and Fu, Yao A., 4,966,453, Cl. 351-242.000.

Fuji Electric Company, Ltd.: *See—*
Moteki, Eiji, 4,967,292, Cl. 360-78.130.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, 4,967,361, Cl. 564-424.050.

Fuji Photo Film Co., Ltd.: *See—*
Hiiro, Hiroyuki, 4,966,443, Cl. 350-354.000.
Inoue, Noriyuki, 4,966,833, Cl. 430-378.000.
Inoue, Noriyuki; Hirano, Shigeo; Kojima, Tetsuo; and Yamamoto, Mitsuru, 4,966,836, Cl. 430-598.000.
Ishikawa, Takatoshi; and Ueda, Shinji, 4,966,834, Cl. 430-393.000.
Kaneko, Kiyotaka; Miyake, Izumi; Nakane, Yoshio; and Shimaya, Hiroshi, 4,967,294, Cl. 360-78.130.
Matushita, Tetunori; Yagihara, Morio; and Sakanoue, Kei, 4,966,835, Cl. 430-393.000.
Mitake, Hiroshi, 4,966,544, Cl. 425-552.000.
Otake, Katsumi; and Iwakami, Nobuyuki, 4,966,285, Cl. 206-455.000.
Shimura, Kazuo, 4,967,079, Cl. 250-327.200.
Shinagawa, Yukio, 4,966,826, Cl. 430-262.000.
Shinoki, Hiroshi; and Ono, Mitsunori, 4,966,607, Cl. 8-549.000.
Shuji, Ono; Kimura, Tsutomu; and Takasaki, Yoshimi, 4,967,073, Cl. 250-235.000.
Sonoda, Fumihiro, 4,967,274, Cl. 358-160.000.
Suzuki, Chiaki; and Shimizu, Shigehisa, 4,965,931, Cl. 29-783.000.
Suzuki, Nobuo; Sakasai, Yutaka; and Sato, Hideo, 4,966,825, Cl. 430-137.000.
Tanaka, Mitsutoshi; Arai, Fuminori; Terashima, Kaoru; and Yaginuma, Nakatsugu, 4,966,784, Cl. 427-2.000.
Terai, Fumitaka; Yukawa, Kimio; and Suefuji, Mineo, 4,966,792, Cl. 427-358.000.
Yamamoto, Takashi, 4,967,266, Cl. 358-76.000.

Fuji, Saburo: *See—*
Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, 4,966,766, Cl. 424-422.000.

Fuji Xerox Co., Ltd.: *See—*
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.
Obara, Tsuneo, 4,967,232, Cl. 355-233.000.
Sasaki, Yutaka; and Murakami, Shinichi, 4,967,237, Cl. 355-290.000.

Fujii, Kunio: *See—*
Ono, Yoichi; Fujii, Kunio; Hinata, Shoji; and Wakabayashi, Satoshi, 4,966,442, Cl. 350-339.00R.

Fujii, Yasumasa: *See—*
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.

Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, to Nissan Motor Company, Limited; and Hitachi Powdered Metals Company, Limited. Sintered ferro alloy having heat and wear resistance and process for making. 4,966,626, Cl. 75-238.000.

Fujikura, Takashi: *See—*
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,966,904, Cl. 514-301.000.

Fujimagari, Hiroshi: *See—*
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.

Fujimoto, Nobuaki, to Kitagawa Industries Company, Ltd. Substrate support of integral construction. 4,966,482, Cl. 403-24.000.

Fujimoto, Sachito; Sugino, Takuya; Takahasi, Shunji; and Hashiguchi, Makoto, to Honda Giken Kogyo K.K. Fuel supply control system for internal combustion engines. 4,966,111, Cl. 123-339.000.

Fujimoto, Yoshiaki, to Kabushiki Kaisha Kobe Seiko Sho. Reverse rotation preventing device for diesel engine. 4,966,113, Cl. 123-359.000.

Fujimoto, Yuji: *See—*
Bentz, Joseph C.; Yonushonis, Thomas M.; Patten, James W.; and Fujimoto, Yuji, 4,966,108, Cl. 123-90.510.

Fujimura, Yoshihiko: *See—*
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.

Fujisaki, Hiromi: *See—*
Fujisaki, Kazuhiro; and Fujisaki, Hiromi, 4,967,190, Cl. 340-700.000.

Fujisaki, Kazuhiro; and Fujisaki, Hiromi, to Hitachi, Ltd. Method of and apparatus for controlling screen display. 4,967,190, Cl. 340-700.000.

Fujishiro, Takashi: *See—*
Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, 4,967,359, Cl. 364-424.050.

Fujita, Takayoshi; Nishinaka, Hisao; Obota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, to Toyo Boseki Kabushiki Kaisha. Potential bulky polyester associated bundles for woven or knitted fabric and process for production thereof. 4,965,919, Cl. 28-220.000.

Fujitsu Limited: *See—*
Akutagawa, Satoshi, 4,967,229, Cl. 355-53.000.
Aruga, Keiji; Mizoshita, Yoshifumi; Iwatsubo, Masahito; and Hatagami, Toshifumi, 4,967,293, Cl. 360-78.120.
Mieno, Fumitake; Kurita, Kazuyuki; Nakamura, Shinji; and Shimizu, Atuo, 4,966,861, Cl. 437-99.000.
Murakami, Yoshishige; Hirota, Kanji; and Nakamura, Masaaki, 4,967,276, Cl. 358-183.000.
Ohyabu, Keiji; Watarai, Shinichi; and Sano, Hideaki, 4,966,356, Cl. 271-9.000.
Sakakura, Sigeki, 4,967,239, Cl. 355-309.000.
Yagi, Takeshi; and Tamura, Toshio, 4,967,406, Cl. 370-16.000.

Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, to Hoffmann-La Roche Inc. Fluorocytidine derivatives. 4,966,891, Cl. 514-49.000.

Fukami, Masataka: *See—*
Inagaski, Hiroyoshi; Fukami, Masataka; and Kondo, Kenji, 4,966,494, Cl. 405-184.000.

Fukasawa, Yoshiharu; Yamaguchi, Satoshi; and Ishihara, Hideo, to Kabushiki Kaisha Toshiba. Sputtering target. 4,966,676, Cl. 204-298.120.

Fukazawa, Toru: *See—*
Akitaya, Shinichi; Fukazawa, Toru; Nozokido, Yutaka; and Tabata, Nobuchika, 4,966,931, Cl. 524-100.000.

Fukuda, Naohisa: *See—*
Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,966,973, Cl. 546-269.000.

Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, to Hitachi, Ltd.; and Hitachi Engineering, Ltd. Operation control apparatus for a processor having a plurality of arithmetic devices. 4,967,339, Cl. 364-200.000.

Fukumoto, Fumio: *See—*
Ishii, Kenjiro; Fukumoto, Fumio; Nagata, Koichi; and Shibata, Akira, 4,967,228, Cl. 355-40.000.

Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, to Nissan Motor Company, Limited. Actively controlled suspension system with power supply control. 4,967,360, Cl. 364-424.050.

Fukushima, Naoto: *See—*
Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, 4,967,360, Cl. 364-424.050.

Fukushima, Shinichi: *See—*
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.

Fukuvi Chemical Industry Co., Ltd.: *See—*
Hasegawa, Hiroaki; Sakai, Norio; and Osugi, Kazuhiko, 4,966,794, Cl. 428-15.000.

Furuhata, Takashi; Takahashi, Hiroaki; and Katsuki, Manabu, to Hitachi, Ltd. Signal processing method and apparatus. 4,967,161, Cl. 328-22.000.

Furukawa, Katsuki: *See—*
Suzuki, Akira; and Furukawa, Katsuki, 4,966,860, Cl. 437-31.000.

Furukawa, Kenji: *See—*
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,966,727, Cl. 252-299.610.

Furuyama, Tohru: *See—*
Watanabe, Yohji; and Furuyama, Tohru, 4,967,395, Cl. 365-203.000.

Furuzawa, Yuuji: *See—*
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Fuss, Manfred: *See—*
Lehmann, Werner; Fuss, Manfred; and Kurtz, Joachim, 4,966,353, Cl. 270-45.000.

Futamata, Yukio: *See—*
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.

Fuwa, Yoshio: *See—*
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

G. Siempelkamp GmbH & Co.: *See—*
Zitzmann, Klaus, 4,966,642, Cl. 156-164.000.

Gaddipati, Achuta R.: *See—*
Charles, Richard J.; and Gaddipati, Achuta R., 4,966,625, Cl. 75-234.000.

Gaf-Huels Chemie GMBH: *See—*
Westernacher, Helmut; Aertken, Karl; and Stieren, Thomas, 4,967,019, Cl. 568-873.000.

Gaffab, Abdul; Polefka, Thomas G.; Feriauto, Robert J., Jr.; and Crisafulli, Rosemarie M., to Colgate-Palmolive Company. Anticalculus oral composition. 4,966,777, Cl. 424-52.000.

Gagne, Albert P. Pest trapping and extermination system. 4,965,959, Cl. 43-61.000.

Gainer, James; and Bentley, Robert L. Smoke and toxic gas suppressant composition. 4,966,920, Cl. 521-99.000.

Gallaher Business Development Corp.: *See*—
Gallaher, John K., Jr., 4,967,267, Cl. 358-88.000.
Gallaher, John K., Jr., to Gallaher Business Development Corp. Apparatus for formatting and viewing a stereoscopic video frame. 4,967,267, Cl. 358-88.000.
Gang, Achim; Schraag, Martin; and Blendinger, Gunter, to Hewlett-Packard Company. Transducer. 4,966,152, Cl. 128-661.070.
Gangemi, Ronald J. Infusion apparatus. 4,966,585, Cl. 604-131.000.
Ganter, Karl-Werner: *See*—
Westerhaus, Axel; Ganter, Karl-Werner; and Buxbaum, Gunter, 4,966,641, Cl. 106-456.000.
GAO Gesellschaft fur Automation und Organisation mbH: *See*—
Haghiri-Tehrani, Yahya; and Hoppe, Joachim, 4,966,857, Cl. 437-209.000.
Garcia, Evaristo, Jr.: *See*—
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey E., 4,966,865, Cl. 437-192.000.
Gardano, Andrea: *See*—
Casagrande, Francesco; Foa, Marco; Gardano, Andrea; and Chapoy, L. Lawrence, 4,966,957, Cl. 528-193.000.
GardenAmerica: *See*—
Carroll, David T., 4,967,098, Cl. 307-140.000.
Gardiner, Jack C.; and Holland, Russell P., II. Chlorine induction apparatus for treatment of wastewater. 4,966,690, Cl. 210-86.000.
Garner-Gray, Peter F.; Knight, Peter C.; and Niven, Ian; E., to Lever Brothers Company, division of Conopco, Inc. Detergent composition. 4,966,606, Cl. 252-174.140.
Garner, William H.: *See*—
Crosson, Craig E.; Barton, Beverly E.; Garner, William H.; and Gwon, Arlene E., 4,966,577, Cl. 604-20.000.
Garombo, Michele. Automatic threading device for lathes. 4,966,058, Cl. 82-154.000.
Garrabrant, Genevieve: *See*—
Lund, Mark A.; and Garrabrant, Genevieve, 4,966,390, Cl. 280-772.000.
Gartner, Josef: *See*—
Fischer, Rudolf; and Gartner, Josef, 4,966,188, Cl. 137-489.000.
Garuts, Valdis E.: *See*—
Birck, Jonathan D.; and Garuts, Valdis E., 4,966,160, Cl. 128-746.000.
Garvey, James F., to Research Foundation of State University of NY, The. Method for the production of oxide superconducting films by laser assisted molecular beam epitaxy. 4,966,887, Cl. 505-1.000.
Gary, Lonnie F., to Gary Products Group, Inc. Plastic ornament hanger. 4,966,344, Cl. 248-317.000.
Gary Products Group, Inc.: *See*—
Gary, Lonnie F., 4,966,344, Cl. 248-317.000.
Garzelli, Giorgio: *See*—
Turbanti, Luigi; and Garzelli, Giorgio, 4,966,993, Cl. 562-540.000.
Gaz de France: *See*—
Cornil, Jean-Philippe, 4,966,307, Cl. 222-3.000.
Gebruder Sucker & Franz Muller GmbH & Co.: *See*—
Bosch, Bernd, 4,966,333, Cl. 242-75.510.
Gegenwart, Rainer: *See*—
Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, 4,966,677, Cl. 204-298.210.
Geiger, Robert E., to Ingersoll-Rand Cor ,pany. Lockable nut for axial adjustment. 4,966,474, Cl. 384-517.000.
Geisinger, Penrod C., to Vaporless Manufacturing, Inc. Check valve for a leak detector. 4,966,190, Cl. 137-613.000.
Geisler, Robert A.: *See*—
Lakshmanan, Vaikuntam I.; Melnbardis, Dzinsars; Geis .er, Robert A.; and McQueen, Nairn M., 4,556,761, Cl. 423-118.000.
Geiss, Karl-Heinz: *See*—
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, 4,966,894, Cl. 514-56.000.
Geissler, Ulrich: *See*—
Doenges, Reinhard; Ruckert, Hans; Geissler, Ulrich; and Steppan, Hartmut, 4,966,828, Cl. 430-281.000.
Gelfand, David H., to Cetus Corporation. Stable high copy number plasmids. 4,966,840, Cl. 435-69.100.
Gemcor Engineering Corp.: *See*—
Speller, Thomas H., Sr.; Davern, John W.; Weaver, Jeffrey P.; and Andrews, Mark J., 4,966,323, Cl. 227-51.000.
General DataComm, Inc.: *See*—
Reymond, Welles K.; and Sorrentino, Gregory L., 4,966,556, Cl. 439-80.000.
General Electric CGR S.A.: *See*—
Callier, Bernard; and Maynard, Jean-Pierre, 4,967,333, Cl. 363-17.000.
General Electric Company: *See*—
Baliga, Bantval J.; and Schlecht, Martin F., 4,967,243, Cl. 357-23.400.
Beebe, Kenneth W., 4,966,001, Cl. 60-737.000.
Charles, Richard J.; and Gaddipati, Achuta R., 4,966,625, Cl. 75-234.000.
Ciokajlo, John J.; and Ritchie, Henry B., 4,965,994, Cl. 60-39.750.
Claydon, Glenn S.; and Laughton, William J., 4,967,332, Cl. 363-17.000.
Dieterich, Charles B., 4,967,263, Cl. 358-11.000.
Dougherty, John J., 4,967,304, Cl. 361-31.000.
Gordon, Bruce J., 4,966,338, Cl. 244-54.000.
Gross, David C.; and Lucas, Gary M., 4,966,922, Cl. 522-25.000.
Jaster, Heinz; and Bessler, Warren F., 4,966,010, Cl. 62-179.000.
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.
Schelhorn, Robert L., 4,967,315, Cl. 361-424.000.
Steigerwald, Robert L., 4,967,109, Cl. 307-571.000.
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.
General Electric Company, p.l.c., The: *See*—
Arambepola, Bernard, 4,967,200, Cl. 342-25.000.
General Electrodynamics Corporation: *See*—
Molinar, Tommy B.; and Johnston, Jerome E., 4,967,384, Cl. 364-567.000.
General Hospital Corporation, The: *See*—
Smith, John A.; and Lee, Fang-Jen S., 4,966,848, Cl. 435-193.000.
General Motors Corporation: *See*—
Brewer, Earl G., 4,966,633, Cl. 148-101.000.
Confer, Keith A.; and Rasmussen, Michael E., 4,965,914, Cl. 24-270.000.
Micheli, Adolph L.; and Dungan, Dennis F., 4,966,875, Cl. 501-152.000.
Genlyte: *See*—
Plumly, George W., 4,967,317, Cl. 362-31.000.
Genske, Roger P.; and Kim, Yong J., to American National Can Company. Multiple layer sheet structures and package. 4,966,795, Cl. 428-34.300.
Genus, Inc.: *See*—
Purser, Kenneth H., 4,967,078, Cl. 250-309.000.
George, Curtis L.; and George, Sandra L. Shoe horn and cane apparatus. 4,966,316, Cl. 223-119.000.
George, Sandra L.: *See*—
George, Curtis L.; and George, Sandra L., 4,966,316, Cl. 223-119.000.
Gerdau, Thomas, to Hoechst Aktiengesellschaft. Process for the preparation of alkali metal phosphonoformates. 4,966,991, Cl. 562-24.000.
Gerstner, Roland: *See*—
Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krspp, Michael, 4,967,316, Cl. 361-424.000.
Gevins, Alan S.; Durousseau, Donald; and Libove, Joel, to Sam Techology Inc. Dry electrode brain wave recording system. 4,967,038, Cl. 128-644.000.
Giannini, Robert P.; and Goodstein, Stephen, to Himedics, Inc. Prednisone microencapsulated granules. 4,966,770, Cl. 424-461.000.
Gilbarco Inc.: *See*—
Kaehler, David L., 4,967,366, Cl. 364-479.000.
Gilbert, Robert M.: *See*—
Friedli, Floyd E.; and Gilbert, Robert M., 4,967,008, Cl. 564-512.000.
Giles, Gary J., to Dresser Industries, Inc. System to avoid icing in the discharge piping of a pressure relief valve. 4,966,184, Cl. 137-205.500.
Giles, Vincent B. Bicycle accessory for carrying a shackle. 4,966,382, Cl. 280-288.400.
Gilles, Leo: *See*—
McCusker, Redmond; Heibel, Helmut; and Gilles, Leo, 4,966,530, Cl. 417-273.000.
Gillespie, Larrian, to Angiogenics, Ltd. Method and composition for arresting angiogenesis and capillary, cell or membrane leakage. 4,966,890, Cl. 514-25.000.
Gimpera, Jose : *See*—
Bruckner, Raimund; and Gimpera, Jose , 4,966,314, Cl. 222-598.000.
Giray, Guenes; Huthmacher, Klaus; Kleemann, Axel; and Lied, Thomas, to Degussa Aktiengesellschaft. Process for the production of 1,2-dithiolan-3-pentanoic acid (thioctic acid) and 8-hydrocarbylthio-6-oxooctanoic acid. 4,966,732, Cl. 260-399.300.
Givaudan Corporation: *See*—
Bachmann, Jean-Pierre; and Pesaro, Mario, 4,966,172, Cl. 131-276.000.
Glamkowski, Edward J.; and Hamer, R. Richard L., to Hoechst-Roussel Pharmaceuticals Inc. 1-aryl-3-isoquinolinecarboxamides. 4,966,906, Cl. 514-309.000.
Glassman, Jacob A. Ophthalmic drape with built-in mini-mask. 4,966,168, Cl. 128-853.000.
Glaverbel: *See*—
Neusy, Hubert, 4,966,617, Cl. 65-21.300.
Glavish, Hilton F.: *See*—
Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., 4,967,088, Cl. 250-491.100.
Glinski, Jerome V., Jr.: *See*—
Janson, David A.; Glinski, Jerome V., Jr.; and Preston, David M., 4,966,246, Cl. 180-140.000.
Glover, Alfred H.: *See*—
Betterton, Joseph T.; McKee, Thomas S.; and Glover, Alfred H., 4,967,047, Cl. 200-83.00J.
Glover, Mary A., to McConway & Torley Corporation. Slackless rotary drawbar assembly. 4,966,291, Cl. 213-71.000.
Godbey, E. Floyd, Jr.; Wolfe, Norman G.; and Zepka, David J., to Akzo Coatings, Inc. Carbodiimide and metal containing emulsion or dispersion coating composition. 4,966,948, Cl. 525-329.900.
Godlewski, Daniel J.: *See*—
Pollock, Robert W.; and Godlewski, Daniel J., 4,967,086, Cl. 250-483.100.
Goe, Gerald L.; McGill, Charles K.; and Sherman, Angela R., to Reilly Industries, Inc. Process and catalyst for the preparation of 2,2'-bipyridyls. 4,966,972, Cl. 546-260.000.

Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krapp, Michael, to Robert Bosch GmbH. Electric circuit unit. 4,967,316, Cl. 361-424.000.

Goldenberg, Barbara L.: *See*—
Reilly, David M.; Nicoli, Anthony M.; Schulze, Richard G.; and Goldenberg, Barbara L., 4,967,089, Cl. 250-493.100.

Goldman, Jerome L. Semisubmersible vessel with captured constant tension buoy. 4,966,495, Cl. 405-224.000.

Goldmann, Gerd: *See*—
Becker, Robert; Goldmann, Gerd; von Gizycki, Ulrich; and von Bonin, Wulf, 4,966,501, Cl. 428-113.000.

Goldstein, Joseph L.: *See*—
Brown, Michael S.; Goldstein, Joseph L.; and Russell, David W., 4,966,837, Cl. 435-6.000.

Gollnow, Klaus: *See*—
Thuesen, Sven E.; and Gollnow, Klaus, 4,966,006, Cl. 62-89.000.

Gomez, Fernando N.: *See*—
Andreu, Enrique M.; Gomez, Fernando N.; Vallejo, Jose L. R.; and Ostariz, Jose L. S., 4,966,956, Cl. 528-185.000.

Gonser, Donald I., to Den-Tal-Ez, Inc. Sterilizable non-lubricated rotary instrument for dental and medical use. 4,966,552, Cl. 433-132.000.

Gonzalez, Antonio, to Hydro-Quebec. Portable detector device for detecting partial electrical discharge in live voltage distribution cables and/or equipment. 4,967,158, Cl. 324-536.000.

Goodman, Geoffrey; Cagan, Uri; and Orlans, Yitzhak, to Amiad U.S.A., Inc. Filter. 4,966,701, Cl. 210-419.000.

Goodstein, Stephen: *See*—
Giannini, Robert P.; and Goodstein, Stephen, 4,966,770, Cl. 424-461.000.

Gordon, Bruce J., to General Electric Company. Aircraft pylon. 4,966,338, Cl. 244-54.000.

Gornati, Silvano: *See*—
Betti, Giorgio; Zuffada, Maurizio; Sacchi, Fabrizio; and Gornati, Silvano, 4,967,139, Cl. 323-312.000.

Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, to Takeda Chemical Industries, Ltd. 2-substituted coumaran derivatives. 4,966,973, Cl. 546-269.000.

Grace, John M.: *See*—
Bock, Ditmar H.; and Grace, John M., 4,966,034, Cl. 73-146.500.

Graef, Kurt: *See*—
Schulz, Winfried; Kirchhoffer, Johann; and Graef, Kurt, 4,966,050, Cl. 74-867.000.

Grant, Frederic F.; and Grant, John, to Datatape Incorporated. Multiple channel rotary magnetic head scanner having stackable electro-optical signal transmission modules. 4,967,290, Cl. 360-64.000.

Grant, John: *See*—
Grant, Frederic F.; and Grant, John, 4,967,290, Cl. 360-64.000.

Grapha-Holding AG: *See*—
Grunder, Roland, 4,966,354, Cl. 270-56.000.

Grass Valley Group, Inc., The: *See*—
Chaplin, Daniel J., 4,967,277, Cl. 358-183.000.

Grasselli, Giorgio: *See*—
McCullough, Timothy J.; and Grasselli, Giorgio, 4,965,909, Cl. 17-21.000.

Greaney, Mark A.: *See*—
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; and Beltzer, Morton, 4,966,719, Cl. 252-42.700.

Great Lakes Chemical Corporation: *See*—
Favstritsky, Nicolai A.; Hein, Arthur J.; and Squires, Glade E., 4,966,716, Cl. 210-755.000.
Favstritsky, Nicolai A.; and Mamuzic, Rastko I., 4,966,946, Cl. 525-314.000.

Green, Christopher T.: *See*—
Pathak, Vijay K.; and Green, Christopher T., 4,967,256, Cl. 357-38.000.

Green Corporation: *See*—
Asano, Kiyoji, 4,966,569, Cl. 446-440.000.

Green, Kenneth G.: *See*—
Albright, Russell E.; and Green, Kenneth G., 4,966,422, Cl. 312-218.000.

Greenbaum, Steve. Video camera with a transverse tilt detector and indicator comprising an ordered array of light-emitting diodes. 4,967,278, Cl. 358-224.000.

Greenberg, Burton, to VidCode, Inc. Television program transmission verification method and apparatus. 4,967,273, Cl. 358-142.000.

Greene, Paul J.: *See*—
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,966,947, Cl. 525-327.600.

Gregerson, Barry; and Dressen, Larry, to Empak, Inc. Substrate package. 4,966,284, Cl. 206-444.000.

Gregoli, Armand A.; Olah, Andrew M.; Hamshar, John A.; and Rimmer, Daniel P., to Canadian Occidental Petroleum Ltd. In situ application of high temperature resistant surfactants to produce water continuous emulsions for improved crude recovery. 4,966,235, Cl. 166-267.000.

Gregor, Carl H., to Peroxid-Chemie GmbH. Process for treatment of clarification sludge. 4,966,706, Cl. 210-609.000.

Greil, Andreas: *See*—
Althaus, Hans-Ludwig; and Greil, Andreas, 4,966,439, Cl. 350-253.000.

Greletepouse Rautureau, Marilys: *See*—
Bisagni, Emile R. B.; and Greletepouse Rautureau, Marilys, 4,966,971, Cl. 546-64.000.

Grenga, John J.: *See*—
Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., 4,966,179, Cl. 135-19.500.

Gressel, Philip D.; Roehrs, Robert E.; Ubels, John L.; and Edelhauser, Henry F., to Alcon Laboratories, Inc. Topical ophthalmic compositions containing microfine retinoid particles. 4,966,773, Cl. 424-489.000.

GRETAG Aktiengesellschaft: *See*—
Ott, Hans, 4,967,379, Cl. 364-526.000.

Gretz, Bruce D.; and Tilley, Scott W., to Ford Aerospace Corporation. Method of controlling a seven degree of freedom manipulator arm. 4,967,126, Cl. 318-568.190.

Gries, Manfred: *See*—
Muller, Roland; Gries, Manfred; and Klein, Roland, 4,965,983, Cl. 53-435.000.

Griffin, Paul G.: *See*—
DeGonia, David J.; and Griffin, Paul G., 4,966,720, Cl. 252-45.000.

Griffin, Roy N. Positive rotational stability putter. 4,966,369, Cl. 273-80.00A.

Griffiths, Andrew: *See*—
Ahsan, M. Quamrul; Griffiths, Andrew; Haug, Ernest; and Norcross, Roy, 4,966,715, Cl. 210-721.000.

Grigo, Ulrich: *See*—
Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, 4,966,958, Cl. 528-271.000.

Grimm, Rainer: *See*—
Schmidhuber, Karl; Grimm, Rainer; and Bohm, Horst, 4,966,409, Cl. 296-213.000.

Grody, Donald R.: *See*—
Frye, Kenneth G.; Fitzpatrick, Donald C.; and Grody, Donald R., 4,966,521, Cl. 414-788.800.

Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., to U.S. Philips Corporation. Current-source arrangement. 4,967,140, Cl. 323-315.000.

Gross, Alan: *See*—
Hull, Harold L.; and Gross, Alan, 4,966,400, Cl. 294-1.400.

Gross, David C.; and Lucas, Gary M., to General Electric Company. Dual curable silicone compositions. 4,966,922, Cl. 522-25.000.

Grossinger, Israel: *See*—
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, 4,966,824, Cl. 430-115.000.

Grove, Bruce: *See*—
Hegedus, Leslie J.; and Grove, Bruce, 4,965,946, Cl. 40-124.400.

Grover, Wayne D., to Alberta Telecommunications Research Centre. Method and apparatus for frame-bit modulation and demodulation of DS3 signal. 4,967,411, Cl. 370-110.100.

Gruber, Wilhelm: *See*—
Langerbeins, Klaus; and Gruber, Wilhelm, 4,966,877, Cl. 502-209.000.

Grunder, Roland, to Grapha-Holding AG. Method of and machine for gathering paper sheets and the like. 4,966,354, Cl. 270-56.000.

Gruning, Horst: *See*—
Bauer, Friedhelm; and Gruning, Horst, 4,967,255, Cl. 357-37.000.

GTE Products Corporation: *See*—
Kim, Tai K.; and McClintic, Robert P., 4,966,710, Cl. 210-665.000.
Schlitt, Steven C., 4,967,090, Cl. 250-504.00R.

Guenkel, Alfred A. Processes for concentrating nitric acid. 4,966,276, Cl. 203-13.000.

Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, to BASF Aktiengesellschaft. Benzopyrans for use in recording systems. 4,966,983, Cl. 549-389.000.

Guglielmo, Giorgio: *See*—
Carmello, Diego; and Guglielmo, Giorgio, 4,967,023, Cl. 570-166.000.

Guittard, George V.; Wong, Patrick S. L.; Theeuwes, Felix; and Cortese, Richard, to ALZA Corporation. Method for delivering dosage form for diltiazem. 4,966,769, Cl. 424-473.000.

Gumprecht, William H.; Schindel, Wesley G.; and Felix, Vinci M., to Du Pont de Nemours, E. I., and Company. Catalyzed hydrofluorination process. 4,967,024, Cl. 570-168.000.

Gunaratne, Manel: *See*—
Scherowsky, Gunter; and Gunaratne, Manel, 4,966,726, Cl. 252-299.600.

Gunther, Klaus, to Hoechst Aktiengesellschaft. Acetals, and a process for the preparation thereof. 4,967,012, Cl. 568-415.000.

Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., to British Gas plc. Ground probing radar method and apparatus. 4,967,199, Cl. 342-22.000.

Guthlein, Werner: *See*—
Deneke, Ulfert; Guthlein, Werner; Weckerle, Wolfgang; and Wielinger, Hans, 4,966,855, Cl. 436-66.000.

Guthrie, Linda T.: *See*—
Kraus, Jeffrey L.; and Guthrie, Linda T., 4,966,163, Cl. 128-772.000.

Guy, Jean: *See*—
Tissot, Patrick; Guy, Jean; and Patel, Claude, 4,965,889, Cl. 4-234.000.

Gwon, Arlene E.: *See*—
Crosson, Craig E.; Barton, Beverly E.; Garner, William H.; and Gwon, Arlene E., 4,966,577, Cl. 604-20.000.

H. G. Wallace Limited: *See*—
Rayman, Gerrard A.; Sugarman, Harvey L.; and Harris, Ivan P., 4,966,588, Cl. 604-165.000.

Habitat International, Inc.: *See*—
Morris, David, 4,966,370, Cl. 273-176.00F.

Haemmerle AG: *See—*
Zbornik, Vaclav, 4,966,029, Cl. 72-379.200.
Haerle, Hans A., to Schaebische Huettenwerke GmbH. Inner support matrix for moulded bodies. 4,966,811, Cl. 428-375.000.
Haga, Kyosuke: *See—*
Asano, Hiroaki; Haga, Kyosuke; and Ito, Isao, 4,966,268, Cl. 192-58.00C.
Haghiri-Tehrani, Yahya; and Hoppe, Joachim, to GAO Gesellschaft fur Automation und Organisation mbH. Data carrier having an integrated circuit and a method for producing same. 4,966,857, Cl. 437-209.000.
Hagiwara, Yoshiki: *See—*
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, 4,967,299, Cl. 360-121.000.
Hagiwara, Yoshimune: *See—*
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, 4,967,349, Cl. 364-200.000.
Hall, Burness C. Programmable time varying control system and method. 4,967,382, Cl. 364-557.000.
Hall, Jerry B.; and Russo, Anthony. Process for extracting oil from tar sands. 4,966,685, Cl. 208-390.000.
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., to AECI Limited. Loading of boreholes with explosive. 4,966,077, Cl. 102-313.000.
Hallstrom, Olof A., Jr: Reciprocating conveyor with detachable power drive. 4,966,275, Cl. 198-750.000.
Halm, Roland L.; and Zapp, Regie H., to Dow Corning Corporation. Method for preparing organohalosilanes. 4,966,986, Cl. 556-473.000.
Hamada, Masataka; and Ishida, Tokuji, to Minolta Camera Kabushiki Kaisha. Automatic focusing device. 4,967,224, Cl. 354-402.000.
Hamakawa, Hiroyuki: *See—*
Katafuchi, Toshinobu; and Hamakawa, Hiroyuki, 4,966,355, Cl. 271-3.100.
Hamamatsu Photonics Kabushiki Kaisha: *See—*
Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,967,144, Cl. 324-96.000.
Takemori, Tamiki, 4,967,093, Cl. 250-560.000.
Urakami, Tsuneyuki; and Takiguchi, Yoshihiro, 4,967,080, Cl. 250-336.100.
Hamann, Lutz: *See—*
Ficht, Reinhold; and Hamann, Lutz, 4,966,068, Cl. 92-193.000.
Hamburgen, William R., to Digital Equipment Corporation. Composite graphite heat pipe apparatus and method. 4,966,226, Cl. 165-104.260.
Hamer, R. Richard L.: *See—*
Glamkowski, Edward J.; and Hamer, R. Richard L., 4,966,906, Cl. 514-309.000.
Hamersley, Alan B.: *See—*
Nomula, Ram R.; Hamersley, Alan B.; and Rudd, Gordon, 4,967,286, Cl. 358-342.000.
Hammell, Ernst: *See—*
Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., 4,967,088, Cl. 250-491.100.
Hammond, Milton L.: *See—*
Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., 4,966,907, Cl. 514-337.000.
Hamner, Larry D.: *See—*
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., 4,966,229, Cl. 165-41.000.
Hampl, Edward F., Jr.; and Iqbal, Mohammad, to Minnesota Mining and Manufacturing Company. High purity aromatic polyesters. 4,967,306, Cl. 361-323.000.
Hampl, Jan; Taraba, Oldrich; and Valenta, Jiri, to SKODA koncern Plyzen Prvni brnenska strojirna koncernoy podnik. Method and apparatus for adaptive control of the trajectory of a working process. 4,967,365, Cl. 364-474.150.
Hamshar, John A.: *See—*
Gregoli, Armand A.; Olah, Andrew M.; Hamshar, John A.; and Rimmer, Daniel P., 4,966,235, Cl. 166-267.000.
Han, Seong-sook, to Samsung Aerospace Industries, Ltd. Film advancing and rewinding device for a camera. 4,967,213, Cl. 354-173.100.
Haninger, Rudolf: *See—*
Winkler, Hans-Henning; Rutschle, Eugen; and Haninger, Rudolf, 4,966,505, Cl. 409-134.000.
Hanka, Robert. Router jig. 4,966,507, Cl. 409-175.000.
Hanlon, Terrance W.: *See—*
Focelle, Dennis M.; and Hanlon, Terrance W., 4,966,603, Cl. 606-158.000.
Hano, Sunao: *See—*
Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, 4,967,360, Cl. 364-424.050.
Hans, Richter, to Blomberg Robotertechnik GmbH. Programming handle. 4,965,939, Cl. 33-558.000.
Hansen, Soren R. Z.: *See—*
Kalnins, Charles M.; Tuckett, Phillip C.; and Hansen, Soren R. Z., 4,966,703, Cl. 210-512.100.
Hanyu, Susumu; and Ninomiya, Masashi, to Janome Sewing Machine Co. Ltd. A sewing machine with a pivotable stitch pattern table. 4,966,089, Cl. 112-444.000.
Hara, Isao: *See—*
Takaki, Usaji; Aoki, Shinobu; Yamamoto, Yoshihiro; and Hara, Isao, 4,966,977, Cl. 548-457.000.
Hara, Ryuichi, to Fanuc Ltd. Tool posture control method for a robot. 4,967,125, Cl. 318-568.110.
Hara, Yukiyoshi: *See—*
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, to Yokogawa Electric Corporation. Process for manufacturing a vibrating type transducer. 4,966,649, Cl. 156-647.000.
Harbolt, Bruce; and Saake, James T., to Union Oil Company of California. Process for preparing sulfur having uniform particle size distribution. 4,966,736, Cl. 264-11.000.
Harden Industries, Inc.: *See—*
Rodstein, Harvey, 4,966,186, Cl. 137-454.500.
Hare, Donald S., to Foto-Wear, Inc. Transfer sheet for applying a creative design to a fabric. 4,966,815, Cl. 428-497.000.
Hargraves, Peter J.; Dirksing, Robert S.; and Merz, Theodore P., to Procter & Gamble Company, The. Packaging of fresh roasted coffee exhibiting improved aroma retention. 4,966,780, Cl. 426-118.000.
Harmon, J. David: *See—*
Domigan, Charles N.; and Harmon, J. David, 4,965,972, Cl. 52-221.000.
Harney, William J. J., to Magna International Inc. Powered six-way seat adjustor and mechanisms therefor. 4,966,045, Cl. 74-424.80A.
Harnischfeger Engineers Inc.: *See—*
Sorensen, B. Chuck; and Devroy, Craig A., 4,967,130, Cl. 318-652.000.
Harries, Gwyn, to ICI Australia Limited. Fragmentation of an underground ore body. 4,966,416, Cl. 299-13.000.
Harris, Alan J.: *See—*
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., 4,966,077, Cl. 102-313.000.
Harris, Eric W., Jr.: *See—*
Dumas, Jerome E.; Harris, Eric W., Jr.; and MacDougal, John G., 4,967,187, Cl. 340-628.000.
Harris, Ivan P.: *See—*
Rayman, Gerrard A.; Sugarman, Harvey L.; and Harris, Ivan P., 4,966,588, Cl. 604-165.000.
Harris, Ralph L.: *See—*
Hoffmann, David; and Harris, Ralph L., 4,966,019, Cl. 70-257.000.
Harris, Robert S., to Stant Inc. Tank valve mounting assembly. 4,966,189, Cl. 137-587.000.
Harris Semiconductor Patents Inc.: *See—*
Tate, Larry R., 4,967,388, Cl. 364-760.000.
Harrison Electronic Systems, Inc.: *See—*
Keefer, Colin R., 4,967,045, Cl. 200-296.000.
Hartevelt, Peter D., to ABB Stal AB. Power plant for burning a fuel in a fluidized bed. 4,965,996, Cl. 60-39.464.
Hartstone, John L. Metering arrangement. 4,966,198, Cl. 137-862.000.
Haruki, Toshihiro, to NEC Corporation. Radio message display system. 4,967,194, Cl. 340-825.440.
Haruki, Toshinobu: *See—*
Takuma, Masao; Haruki, Toshinobu; and Kikuchi, Kenichi, 4,967,280, Cl. 358-227.000.
Harvey, Andrew C.; Lusignea, Richard W.; and Racich, James L., to Foster Miller, Inc. Multiaxially oriented thermotropic polymer films and method of preparation. 4,966,807, Cl. 428-220.000.
Hasegawa, Hiroaki; Sakai, Norio; and Osugi, Kazuhiko, to Fukuvi Chemical Industry Co., Ltd. Artificial stone molded body and process for fabrication thereof. 4,966,794, Cl. 428-15.000.
Hasegawa, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Motor control apparatus. 4,967,133, Cl. 318-798.000.
Hasegawa, Jun: *See—*
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.
Hasegawa, Masaki; Saigo, Kazuhiko; Yuki, Yoichi; and Tachibana, Kouzou, to Daicel Chemical Industries, Ltd. Optically active carboalkylated amino alcohols and their utilization in optical resolution. 4,966,985, Cl. 556-116.000.
Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, to Shin-Etsu Polymer Co., Ltd. Printed material imparted with improved water-proofness. 4,966,804, Cl. 428-203.000.
Hasegawa, Takanori; and Negishi, Hideo, to Riso Kagaku Corporation. Mimeographic printing apparatus with a stencil guide. 4,966,073, Cl. 101-120.000.
Hasegawa, Takeshi; and Kobayashi, Akihiko, to Canon Kabushiki Kaisha. Recovery device for an ink jet printer. 4,967,209, Cl. 346-140.00R.
Hashiguchi, Makoto: *See—*
Fujimoto, Sachito; Sugino, Takuya; Takahasi, Shunji; and Hashiguchi, Makoto, 4,966,111, Cl. 123-339.000.
Hashimoto, Akihiro: *See—*
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,966,809, Cl. 428-323.000.
Hashimoto, Isao; Yokoyama, Keiichi; and Kitahara, Takumi, to Mistui Petrochemical Industries, Ltd. Indan derivatives. 4,966,968, Cl. 544-176.000.
Hashimoto, Satoru: *See—*
Maeda, Akira; Yoshimura, Masahiko; and Hashimoto, Satoru, 4,967,350, Cl. 364-200.000.
Hashimoto, Seiji; Satoh, Tamotsu; and Sugawa, Shigetoshi. Signal read-out circuit which lowers diffusion capacitance by limiting emitting current with resistive elements. 4,967,067, Cl. 250-208.100.
Hashimoto, Yasuyuki; and Yamashita, Haruo, to Ancos Co., Ltd. Valve operating mechanism. 4,966,483, Cl. 401-206.000.

Hasselstrom, Per: *See—*
Johansson, Bertil; and Hasselstrom, Per, 4,966,818, Cl. 482-558.000.
Hasslen, John S., III. Sump draining apparatus. 4,966,534, Cl. 417-423.300.
Hata, Yoshiaki: *See—*
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.
Hatagami, Toshifumi: *See—*
Aruga, Keiji; Mizoshita, Yoshifumi; Iwatsubo, Masahito; and Hatagami, Toshifumi, 4,967,293, Cl. 360-78.120.
Hattori, Shigenori: *See—*
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,966,476, Cl. 400-208.000.
Hattori, Tomoaki: *See—*
Suzuki, Makoto; Sakai, Toshio; Hattori, Tomoaki; and Takagi, Izumi, 4,967,227, Cl. 355-32.000.
Hauber, Peter. Low profile, secure camper shell latch. 4,966,018, Cl. 70-208.000.
Haug, Ernest: *See—*
Ahsan, M. Quamrul; Griffiths, Andrew; Haug, Ernest; and Norcross, Roy, 4,966,715, Cl. 210-721.000.
Hauser, Peter: *See—*
Maier, Manfred; Mielke, Manfred; and Hauser, Peter, 4,966,331, Cl. 241-172.000.
Havard, James M.: *See—*
Bayless, Ronald E.; and Havard, James M., 4,967,057, Cl. 219-213.000.
Hawkins, Gerald P. Collapsible storage container and method for storing matter. 4,966,310, Cl. 222-105.000.
Hawley, Marilyn J. Combination luggage, table and vanity. 4,966,258, Cl. 190-4.000.
Haws, Lewis A.: *See—*
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 4,966,170, Cl. 131-88.000.
Hayakawa, Youichi; Hosono, Chihiro; Nishida, Masaaki; and Kato, Kozo, to Aisin Aw Co., Ltd. Thrust washer mounting apparatus. 4,966,264, Cl. 192-3.340.
Hayano, Fuminori; Imamura, Kazunori; and Murata, Sunao, to Nikon Corporation. Inspecting apparatus for determining presence and location of foreign particles on reticles or pellicles. 4,966,457, Cl. 356-237.000.
Hayasaki, Koichi, to Nissan Motor Co., Ltd. System for controlling lock-up clutch. 4,966,263, Cl. 192-3.300.
Hayashi, Chisao: *See—*
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.
Hayashi, Kazuo: *See—*
Sonoda, Takuji; and Hayashi, Kazuo, 4,967,242, Cl. 357-22.000.
Hayashi, Masahiro: *See—*
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.
Hayward, Charles R.: *See—*
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.
Haze, Kenji: *See—*
Sadamori, Masaaki; Haze, Kenji; and Katamine, Tosinori, 4,966,669, Cl. 204-192.120.
Hazen, James L., to BASF Corporation. Adjuvants for use with postemergent herbicides. 4,966,728, Cl. 252-354.000.
Hearn, John R.: *See—*
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.
Hebard, Arthur F., to AT&T Bell Laboratories. Method of producing a device comprising a metal oxide superconductor layer. 4,966,885, Cl. 505-1.000.
Heck, Joseph P.: *See—*
Lynk, Charles N.; and Heck, Joseph P., 4,967,407, Cl. 370-50.000.
Hedstrom Corporation: *See—*
Cunard, Joel C., 4,966,419, Cl. 301-2.500.
Hegedus, Leslie J.; and Grove, Bruce, to Hegedus, Leslie J. Display card or mount. 4,965,946, Cl. 40-124.400.
Heibel, Helmut: *See—*
McCusker, Redmond; Heibel, Helmut; and Gilles, Leo, 4,966,530, Cl. 417-273.000.
Heidolph, Barbara B.; and Jakse, Frank P., to Monsanto Company. Chemical leavening system. 4,966,782, Cl. 426-551.000.
Heimann GmbH: *See—*
Quad, Reiner; Ringelstein, Udo; Plotz, Fred; and Knaup, Gerhard, 4,967,081, Cl. 250-338.100.
Hein, Arthur J.: *See—*
Favstritsky, Nicolai A.; Hein, Arthur J.; and Squires, Glade E., 4,966,716, Cl. 210-755.000.
Heinrich Baumgarten KG Spezialfabrik fuer Beschlagteile: *See—*
Baumgarten, Gerd-Diethard, 4,965,907, Cl. 16-114.00A.
Heinrich, Rudolf; and Albrecht, Konrad, to Hoechst Aktiengesellschaft. Finely dispersed liquid plant protection agents. 4,966,621, Cl. 71-86.000.
Heisen, Arnold: *See—*
Doemens, Guenter; Rose, Thomas; Hoffmann, Detlef; and Heisen, Arnold, 4,967,149, Cl. 324-158.00F.
Heismann, Fred L., to AT&T Bell Laboratories. Integrated-optic endless polarization transformer. 4,966,431, Cl. 350-96.140.
Heistand, Robert H., II: *See—*
Khoury, Issam A.; Heistand, Robert H., II; and Kohatsu, Iwao, 4,966,742, Cl. 264-166.000.
Held, Helmut: *See—*
Satten, Robert; and Held, Helmut, 4,966,481, Cl. 401-205.000.
Hella KG Hueck & Co.: *See—*
Ewert, Alfred; and Kathmann, Franz, 4,967,318, Cl. 362-61.000.
Helmstetter, David A.: *See—*
Reed, Emily J.; and Helmstetter, David A., 4,966,764, Cl. 423-499.000.
Hemedix International, Inc.: *See—*
Kaufman, Jerry M., 4,966,589, Cl. 604-174.000.
Henderson, Robert B.: *See—*
Robertson, Michael K.; and Henderson, Robert B., 4,966,759, Cl. 422-186.000.
Hendrickson, Thomas R., to Quikcoup, Incorporated. Rigid or flexible coupling for pipes. 4,966,395, Cl. 285-12.000.
Henkel Kommanditgesellschaft auf Aktien: *See—*
Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, 4,967,017, Cl. 568-621.000.
Henkel, Wolfgang E.; Stapelfeldt, Volker; and Belling, Dietrich, to Abel Pumpen GmbH & Co. KG, a part interest. Apparatus for controlling the hydraulic circuit of a piston diaphragm pump. 4,966,528, Cl. 417-63.000.
Henkelmann, Jochem: *See—*
Karcher, Michael; Eckhardt, Heinz; and Henkelmann, Jochem, 4,967,015, Cl. 568-616.000.
Henkin, Melvyn L.; and Laby, Jordan M. Hydrotherapy massage method and apparatus. 4,965,893, Cl. 4-542.000.
Henry, Pearison W.: *See—*
Rush, James B.; Bryan, James S.; Henry, Pearison W.; and Trantham, Richardson J., 4,966,741, Cl. 264-154.000.
Hensley, Clifford J. Filter system and scrubber. 4,966,698, Cl. 210-269.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Multiple riser fluidized catalytic cracking process utilizing a C_3–C_4 paraffin-rich co-feed and mixed catalyst system. 4,966,681, Cl. 208-74.000.
Hercules Incorporated: *See—*
Craig, Daniel H., 4,966,939, Cl. 524-811.000.
Herold, Friedrich: *See—*
Cherdron, Harald; Deckers, Hellmuth; Herold, Friedrich; and Hess, Reiner, 4,966,955, Cl. 528-183.000.
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, to BASF Aktiengesellschaft. Polysulfated heparins for treating diseases caused by retroviruses. 4,966,894, Cl. 514-56.000.
Herrmann, Klaus: *See—*
Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, 4,967,017, Cl. 568-621.000.
Hertzberg, Paul E., to Boeing Company, The. Composites made of fiber reinforced resin elements joined by adhesive. 4,966,802, Cl. 428-119.000.
Herzberg, Wolfgang, to Renate Dunsch-Herzberg. Protective facial mask. 4,966,140, Cl. 128-206.190.
Hess, Reiner: *See—*
Cherdron, Harald; Deckers, Hellmuth; Herold, Friedrich; and Hess, Reiner, 4,966,955, Cl. 528-183.000.
Hesterberg, William G.; Donahue, Raymond J.; and Cleary, Terrance M., to Brunswick Corporation. Evaporable foam casting system utilizing a hypereutectic aluminum-silicon alloy. 4,966,220, Cl. 164-34.000.
Hettlage, Eckart; and Ruff, Gerd, to Teldix GmbH. Rotary waveguide switch having arcuate waveguides realized by planar faces. 4,967,170, Cl. 333-106.000.
Hewison, George D., to ITW, Ltd. Method of forming a screw threaded fastener. 4,966,024, Cl. 72-88.000.
Hewlett-Packard Company: *See—*
Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., 4,967,412, Cl. 371-20.100.
Childers, Winthrop D., 4,967,208, Cl. 346-140.00R.
Doan, Alpha N.; and Parkhurst, Anthony D., 4,967,203, Cl. 346-1.100.
Gang, Achim; Schraag, Martin; and Blendinger, Gunter, 4,966,152, Cl. 128-661.070.
Ruder, James L., 4,967,207, Cl. 346-140.00R.
Watson, Paul B., 4,967,173, Cl. 333-260.000.
Hidaka, Katsufumi: *See—*
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.
Hiernaut, Jean-Pol: *See—*
Werner, Paul; and Hiernaut, Jean-Pol, 4,966,737, Cl. 264-14.000.
Higaki, Yoshikazu: *See—*
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.
Higashi, Robert E.: *See—*
Sumner, John P.; Johnson, Robert G.; and Higashi, Robert E., 4,966,037, Cl. 73-204.260.

Higgins, Leo M., III, to Prime Computer Inc. Circuit board construction. 4,967,314, Cl. 361-414.000.
High Yield Technology: *See*—
Borden, Peter G., 4,967,075, Cl. 250-237.00G.
Higuchi, Hideyo: *See*—
Mizuochi, Hitoshi; and Higuchi, Hideyo, 4,966,863, Cl. 437-129.000.
Higuchi, Sumitada: *See*—
Sakamura, Yoshikazu; and Higuchi, Sumitada, 4,966,028, Cl. 72-361.000.
Higuera, Bernard A.; and Arreola, Miguel A., to Russ Bassett Company. Cabinet drawer interlocking apparatus. 4,966,423, Cl. 312-221.000.
Hihara, Mikio; and Suzuki, Nobuhisa, to Nisset Plan, Inc. Mixer unit for cellular concrete paste and method of making such paste. 4,966,463, Cl. 366-3.000.
Hiiro, Hiroyuki, to Fuji Photo Film Co., Ltd. Light beam scanner. 4,966,443, Cl. 350-354.000.
Hilal, Mohammed A., to International Superconductor Corp. DC powered hybrid coil gun employing superconducting elements. 4,966,884, Cl. 505-1.000.
Hill, Gilbert L., to Oliver Rubber Company. Adjustable tire recapping apparatus. 4,966,640, Cl. 156-394.100.
Hill, Giles. Wheel and solid rubber tire assembly and method. 4,966,212, Cl. 152-302.000.
Hill, Tom H. Tool joint gauge. 4,965,937, Cl. 33-199.00R.
Hillman, Joseph T.; Price, J. B.; and Triggs, William M., to Spectrum CVD, Inc. Tungsten disilicide CVD. 4,966,869, Cl. 437-200.000.
Hills, William A.: *See*—
Pfeffer, Henry A.; and Hills, William A., 4,966,762, Cl. 423-415.00P.
Hilti Aktiengesellschaft: *See*—
Magyari, Eugen, 4,966,502, Cl. 408-59.000.
Himedics, Inc.: *See*—
Giannini, Robert P.; and Goodstein, Stephen, 4,966,770, Cl. 424-461.000.
Himmele, Walter: *See*—
Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,967,003, Cl. 564-381.000.
Hinata, Shoji: *See*—
Ono, Yoichi; Fujii, Kunio; Hinata, Shoji; and Wakabayashi, Satoshi, 4,966,442, Cl. 350-339.00R.
Hinterreiter, Ignaz, to Centromint Company Establishment. Tablet dispenser. 4,966,305, Cl. 221-229.000.
Hioki, Toshimichi: *See*—
Sekido, Hiroshi; and Hioki, Toshimichi, 4,965,899, Cl. 5-453.000.
Hipp, Paul: *See*—
Muller, Gottfried; and Hipp, Paul, 4,966,069, Cl. 98-40.110.
Hirai, Masanori, to Teijin Seiki Company Limited. Servo control apparatus. 4,967,124, Cl. 318-564.000.
Hirakawa, Yoshiyuki: *See*—
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, 4,966,899, Cl. 514-197.000.
Hirane, Hideo; Tanno, Kiyohiko; and Iizuka, Hisao, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Light-emitting element array driver circuit. 4,967,192, Cl. 340-811.000.
Hirano, Shigeo: *See*—
Inoue, Noriyuki; Hirano, Shigeo; Kojima, Tetsuo; and Yamamoto, Mitsuru, 4,966,836, Cl. 430-598.000.
Hirano, Takashi; Taguchi, Michio; and Nishide, Kazuhiro, to Yamato Scale Company, Limited. Operational condition setting device for combination weighing machine. 4,967,383, Cl. 364-567.000.
Hirano, Yoshinori, to Nissan Motor Co., Ltd. Automotive vehicle with center bearing of propeller shaft assembly variable in position. 4,966,251, Cl. 180-338.000.
Hirano, Yosihide: *See*—
Ito, Kazumasa; and Hirano, Yosihide, 4,966,115, Cl. 123-418.000.
Hirooka, Masami: *See*—
Kourogi, Isao; and Hirooka, Masami, 4,966,518, Cl. 414-700.000.
Hirosawa, Kouzou; and Kanazawa, Yukio, to Ube Industries, Ltd. Process for treating waste water. 4,966,714, Cl. 210-708.000.
Hirose, Kenji: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.
Hirota, Kanji: *See*—
Murakami, Yoshishige; Hirota, Kanji; and Nakamura, Masaaki, 4,967,276, Cl. 358-183.000.
Hirotsu, Tohru: *See*—
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,967,202, Cl. 343-713.000.
Hisaka, Akihiro: *See*—
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.
Hitachi Automotive Engineering Co., Ltd.: *See*—
Itakura, Tomiya; and Kamifuji, Hiroshi, 4,966,118, Cl. 123-492.000.
Hitachi Cable, Ltd.: *See*—
Hirane, Hideo; Tanno, Kiyohiko; and Iizuka, Hisao, 4,967,192, Cl. 340-811.000.
Hitachi Construction Machinery Co., Ltd.: *See*—
Pusic, Pavo; and Memed, Bozo, 4,966,109, Cl. 123-197.0AB.
Hitachi Engineering Co., Ltd.: *See*—
Okutsu, Mitsuhiko; Kariya, Tadsaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.
Hitachi Engineering, Ltd.: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.
Hitachi, Ltd.: *See*—
Fujisaki, Kazuhiro; and Fujisaki, Hiromi, 4,967,190, Cl. 340-700.000.
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.
Furuhata, Takashi; Takahashi, Hiroaki; and Katsuki, Manabu, 4,967,161, Cl. 328-22.000.
Hirane, Hideo; Tanno, Kiyohiko; and Iizuka, Hisao, 4,967,192, Cl. 340-811.000.
Ishihara, Heigo; Osaki, Akira; and Kudo, Takanori, 4,966,797, Cl. 427-64.000.
Itakura, Tomiya; and Kamifuji, Hiroshi, 4,966,118, Cl. 123-492.000.
Itou, Syunji; Suzuki, Yoshiro; and Sakaguchi, Minoru, 4,967,307, Cl. 361-335.000.
Kajigaya, Kazuhiko; and Tsuchiya, Osamu, 4,967,396, Cl. 365-207.000.
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, 4,967,299, Cl. 360-121.000.
Katsura, Koyo, 4,967,376, Cl. 364-521.000.
Keida, Haruo; Tsukamoto, Takashi; and Nagasaki, Nobutaka, 4,967,352, Cl. 364-200.000.
Kiguchi, Masashi; and Murayama, Yoshimasa, 4,967,141, Cl. 323-360.000.
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, 4,967,349, Cl. 364-200.000.
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Maeda, Kazuhiko; and Shimoyashiro, Sadao, 4,967,386, Cl. 364-578.000.
Naito, Ichiro; Kobayashi, Takahiko; and Maezawa, Hiroyuki, 4,967,348, Cl. 364-200.000.
Nishimura, Yutaka; Ohsuga, Minoru; and Ohyama, Yoshishige, 4,966,033, Cl. 73-118.200.
Okutsu, Mitsuhiko; Kariya, Tadsaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.
Pusic, Pavo; and Memed, Bozo, 4,966,109, Cl. 123-197.0AB.
Shibasaki, Nobuo; Tanaka, Toshio; Nagayama, Yoshiharu; and Yasunari, Kenjiro, 4,967,387, Cl. 364-580.000.
Takase, Akihiko; and Takasaki, Yoshitaka, 4,967,410, Cl. 370-105.100.
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Urataki, Etsuo; Kodama, Masaroshi; and Matsuno, Hiromitsu, 4,967,118, Cl. 315-56.000.
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Hitachi, Ltd: *See*—
Kaga, Toru; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,967,247, Cl. 357-23.600.
Hitachi Microcomputer Engineering: *See*—
Naito, Ichiro; Kobayashi, Takahiko; and Maezawa, Hiroyuki, 4,967,348, Cl. 364-200.000.
Hitachi Microcomputer Engineering Ltd.: *See*—
Keida, Haruo; Tsukamoto, Takashi; and Nagasaki, Nobutaka, 4,967,352, Cl. 364-200.000.
Hitachi Powdered Metals Company, Limited: *See*—
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.
Hitachi Seiko, Ltd.: *See*—
Otani, Tamio; Nishigai, Masao; and Kanaya, Yasuhiko, 4,966,508, Cl. 409-189.000.
Hiwatashi, Yutaka: *See*—
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, 4,967,361, Cl. 564-424.050.
Hjordie, Jorgen, to Lagan Plast AB. Snap locking device for a container with a cover. 4,966,302, Cl. 220-306.000.
Hnizdor, Thomas A. Tandem double offset fishhook. 4,965,957, Cl. 43-44.820.
Ho, Chin-Tien. Multiple exposure structure for a twin lens camera. 4,967,220, Cl. 354-204.000.
Ho, Suzzy C.; and Wu, Margaret M., to Mobil Oil Corporation. Process for improving thermal stability of synthetic lubes. 4,967,032, Cl. 585-255.000.
Hoda, Takeo: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.
Hodge, Stephen R.; and Pearce, Andrew, to BP Chemicals Limited. Bleach activators in detergent compositions. 4,966,723, Cl. 252-102.000.
Hodson, James V. Apparatus for use in applying a thin resinous coating to existing surfaces. 4,966,490, Cl. 404-103.000.
Hodson, James V. Epoxy resin binder compositions and cured products obtained therefrom. 4,966,927, Cl. 523-401.000.
Hoechst Aktiengesellschaft: *See*—
Cherdron, Harald; Deckers, Heilmuth; Herold, Friedrich; and Hess, Reiner, 4,966,955, Cl. 528-183.000.

Doenges, Reinhard; Ruckert, Hans; Geisler, Ulrich; and Steppan, Hartmut, 4,966,828, Cl. 430-281.000.
Gerdau, Thomas, 4,966,991, Cl. 562-24.000.
Gunther, Klaus, 4,967,012, Cl. 568-415.000.
Heinrich, Rudolf; and Albrecht, Konrad, 4,966,621, Cl. 71-86.000.
Kruse, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased, 4,966,987, Cl. 558-115.000.
Scherowsky, Gunter; and Gunaratne, Manel, 4,966,726, Cl. 252-299.600.
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Walteradorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Glamkowski, Edward J.; and Hamer, R. Richard L., 4,966,906, Cl. 514-309.000.

Hoercher, Ulrich; and Lechtken, Peter, to BASF Aktiengesellschaft. Deodorization of fatty ester mixtures. 4,966,734, Cl. 260-420.000.

Hoffman, John P., to Caterpillar Inc. Dual current sensing driver circuit. 4,967,309, Cl. 361-160.000.

Hoffman, Stephen W.: *See*—
Jamoua, Saad A.; and Hoffman, Stephen W., 4,967,398, Cl. 365-230.050.

Hoffmann, David; and Harris, Ralph L. Anti-theft arrangement for a vehicle. 4,966,019, Cl. 70-257.000.

Hoffmann, Detlef: *See*—
Doemena, Guenter; Rose, Thomas; Hoffmann, Detlef; and Heisen, Arnold, 4,967,149, Cl. 324-158.00F.

Hoffmann-La Roche Inc.: *See*—
Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, 4,966,891, Cl. 514-49.000.

Hofmann, Karlheinz: *See*—
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittienbring, Gerhard, 4,966,269, Cl. 192-70.160.

Hofmeester, Paul M. Apparatus for the mixing of gas or gases with air in a controllable ratio for a combustion engine. 4,966,123, Cl. 123-592.000.

Hokkai Can Co., Ltd.: *See*—
Yamashita, Yuji; Kobayashi, Koji; Shimizu, Keisuke; and Makekawa, Koji, 4,966,301, Cl. 220-270.000.

Holland, Russell P., II: *See*—
Gardiner, Jack C.; and Holland, Russell P., II, 4,966,690, Cl. 210-86.000.

Holtronic Technologies Limited: *See*—
Phillips, Nicholas J., 4,966,428, Cl. 350-3.660.

Holzman, Eli. Apparatus for applying surface-mounted electronic components to printed circuit boards. 4,965,927, Cl. 29-740.000.

Hom, Pat Y.: *See*—
Zmyslowski, Allan J.; and Hom, Pat Y., 4,967,351, Cl. 364-200.000.

Hom, Pierre: *See*—
Andrieux, Raymond; Hom, Pierre; and Laseneur, Patrick, 4,967,111, Cl. 310-90.000.

Homma, Yuji: *See*—
Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.

Honda Giken Kogyo K.K.: *See*—
Fujimoto, Sachito; Sugino, Takuya; Takahasi, Shunji; and Hashiguchi, Makoto, 4,966,111, Cl. 123-339.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Ide, Yutaka, 4,966,529, Cl. 417-218.000.
Sakurai Hidetoshi, 4,966,116, Cl. 123-418.000.
Seki, Yasunari; Koike, Yuzuru; Tachibana, Yosuke; and Tsukimura, Kiyoshi, 4,966,110, Cl. 123-327.000.

Honeywell Inc.: *See*—
Reilly, David M.; Nicoli, Anthony M.; Schulze, Richard G.; and Goldenberg, Barbara L., 4,967,089, Cl. 250-493.100.
Sumner, John P.; Johnson, Robert G.; and Higashi, Robert E., 4,966,037, Cl. 73-204.260.

Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, to Kao Corporation. Measurement method for moisture content in the skin and system therefor. 4,966,158, Cl. 128-734.000.

Hoodlebrink, Merlin P.: *See*—
Brandt, Robert H.; and Hoodlebrink, Merlin P., 4,966,693, Cl. 210-195.200.

Hooper, Donald H. Color identification system. 4,966,461, Cl. 356-406.000.

Hoots, John E.; Banks, Rodney H.; and Johnson, Donald A., to Nalco Chemical Company. Transition metals as treatment chemical tracers. 4,966,711, Cl. 210-697.000.

Hoover, Dennis R.: *See*—
Paoluccio, John A.; and Hoover, Dennis R., 4,965,887, Cl. 2-9.000.

Hoppe, Joachim: *See*—
Haghiri-Tehrani, Yahya; and Hoppe, Joachim, 4,966,857, Cl. 437-209.000.

Horie, Kiyoshi: *See*—
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.

Horiguchi, Satoru: *See*—
Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.

Horiuchi, Takashi: *See*—
Nose, Yukihiko; Malchesky, Paul S.; and Horiuchi, Takashi, 4,966,709, Cl. 210-651.000.

Horodysky, Andrew G.: *See*—
Farng, Liehpao O.; and Horodysky, Andrew G., 4,966,721, Cl. 252-51.50R.

Horowitz, Carl; Sanduja, Mohan; and Dichter, Michael, deceased (by Dichter, Anna Dichter and Wilhelm, heirs), to Puro Corporation of America. Bacteriostatic activated carbon filter. 4,966,872, Cl. 502-7.000.

Horsma, David A.; Kamath, Hundi P.; and Fang, Shou-Mean, to Raychem Corporation. Assemblies of PTC circuit protection devices. 4,967,176, Cl. 338-22.00R.

Horton, Robert L.; and Backus, Richard J., to Eastman Kodak Company. Film detection apparatus. 4,967,094, Cl. 250-561.000.

Hose, Horst: *See*—
Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, 4,966,739, Cl. 264-87.000.

Hoshiko, Takeshi, to Junkosha Co., Ltd. Superconducting cable with continuously porous insulation. 4,966,886, Cl. 505-1.000.

Hoshizaki Electric Company Ltd.: *See*—
Yoshida, Kazuhiro; and Tanaka, Yoshinori, 4,966,008, Cl. 62-137.000.

Hosono, Chihiro: *See*—
Hayakawa, Youichi; Hosono, Chihiro; Nishida, Masaaki; and Kato, Kozo, 4,966,264, Cl. 192-3.340.

Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, to Kabushiki Kaisha Toshiba; and Electric Co., Ltd. Apparatus for forming an electrophotographic latent image. 4,967,231, Cl. 355-219.000.

Hoszowski, Andrew K., to Moeller Manufacturing Co., Inc. Dipstick handle. 4,965,942, Cl. 33-730.000.

Houghton, Kenneth S.: *See*—
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.

Houghton, Richard B.; and Obray, Dean C., to Mettler Electronics Corp. Ultrasound power generating system with sampled-data frequency control. 4,966,131, Cl. 128-24.00A.

Houle, Jean C.; and Therrien, Lise. Flying ring. 4,966,373, Cl. 273-339.000.

House of Hardy Limited: *See*—
Humble, Raymond; Hudson, Main; and Norris, Charles, 4,966,336, Cl. 242-295.000.

Houston, Clarence H. Water cooled incinerator. 4,966,086, Cl. 110-215.000.

Howard, Richard E.; and Keene, Joseph P., to Air Products and Chemicals, Inc. Disposable chemical container. 4,966,207, Cl. 141-98.000.

Howe, Peter. Folding freight carrier. 4,966,085, Cl. 108-55.100.

Howitt, Robert: *See*—
Johnson, Melissa C.; and Howitt, Robert, 4,967,323, Cl. 362-103.000.

Howmet Corporation: *See*—
Johnson, Paul R.; and Lassow, Eliot S., 4,966,225, Cl. 164-519.000.

Hozumi, Yoshiyuki: *See*—
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, 4,966,712, Cl. 210-705.000.

Hsu, Chi Ming L.: *See*—
Benjamin, Earl J.; Ke, Charles H.; Hynson, Richard B.; and Hsu, Chi Ming L., 4,966,778, Cl. 426-19.000.

Huang, Alan; and Jahns, Jurgen, to AT&T Bell Laboratories. Mask controlled coupling of inter-substrate optical components. 4,966,446, Cl. 350-417.000.

Huang Alan; and Jahns, Jurgen, to AT&T Bell Laboratories. Integration of free-space planar optical components. 4,966,447, Cl. 350-417.000.

Huang, Chin-Teh; and Blackwell, Gordon B., to Dentsply Research & Development Corp. Biological compatible adhesive containing a phosphorous adhesion promoter and accelerator. 4,966,934, Cl. 524-315.000.

Huang, Tien-Tsai. Tire pressure gauge. 4,966,035, Cl. 73-146.800.

Hudson, James F.: *See*—
Yee, Harold H.; and Hudson, James F., 4,967,174, Cl. 335-5.000.

Hudson, Main: *See*—
Humble, Raymond; Hudson, Main; and Norris, Charles, 4,966,336, Cl. 242-295.000.

Hughes Aircraft Company: *See*—
Clark, William M., Jr.; Walden, Robert H.; and Utlaut, Mark W., 4,967,250, Cl. 357-24.000.
Mosa, Gaylord E.; Wreede, John E.; and Yu, Kevin, 4,966,426, Cl. 350-3.700.
Parker, Merle D., 4,966,427, Cl. 350-6.800.
Shifrin, Gordon A., 4,966,456, Cl. 356-73.000.
Yee, Harold H.; and Hudson, James F., 4,967,174, Cl. 335-5.000.

Hughes, Gregory G.; and Larrabee, Scott, to Modine Manufacturing Co. Serpentine fin, round tube heat exchanger. 4,966,230, Cl. 165-150.000.

Hull, Harold L.; and Gross, Alan. Device for removal of animal droppings and debris. 4,966,400, Cl. 294-1.400.

Huls Aktiengesellschaft: *See*—
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.

Humble, Raymond; Hudson, Main; and Norris, Charles, to House of Hardy Limited. Fishing reel assembly. 4,966,336, Cl. 242-295.000.

Humphrey, Samuel A., to United States of America, Navy. Ice penetrating moored mine. 4,966,079, Cl. 102-411.000.

Hundleby, Giles E., to Ricardo Group PLC. Two-stroke engines. 4,966,104, Cl. 123-65.0BA.
Hung, Ming-Hong, to Du Pont de Nemours, E. I., and Company. Process for fluorinated allenes. 4,967,022, Cl. 570-136.000.
Hunt, John D. Emergency brake. 4,966,256, Cl. 188-72.700.
Hunt, Paul C.: *See*—
Field, Bruce F.; and Hunt, Paul C., 4,967,064, Cl. 250-203.200.
Hunter, Kim R.: *See*—
Cedergreen, Steven D.; Aspiri, Ray; Hunter, Kim R.; and Chiu, Butkui, 4,965,958, Cl. 43-55.000.
Hunter, Rebecca L. Wheeled stand apparatus for hanging containers of medical fluids. 4,966,340, Cl. 248-125.000.
Husky Injection Molding Systems Ltd.: *See*—
Brown, Paul; and Akseirud, Vitaly, 4,966,545, Cl. 425-557.000.
Hustad, Gerald O.: *See*—
Thompson Bjorn J.; Hustad, Gerald O.; and Marnocha, Todd S., 4,966,470, Cl. 383-61.000.
Hutcheon, Ian C.; and Epton, David J., to Measurement Technology Limited. Safety barriers for 2-wire transmitters. 4,967,302, Cl. 361-1.000.
Hutchison, Marion E., to Tiger Industries, Inc. Sod harvesting apparatus. 4,966,239, Cl. 172-20.000.
Huthmacher, Klaus: *See*—
Giray, Guenes; Huthmacher, Klaus; Kloemann, Axel; and Lied, Thomas, 4,966,732, Cl. 260-399.000.
Hydro-Quebec: *See*—
Gonzalez, Antonio, 4,967,158, Cl. 324-536.000.
Hygenic Corporation, The: *See*—
Riaza, John, 4,966,952, Cl. 526-340.200.
Hymson, Richard B.: *See*—
Benjamin, Earl J.; Ke, Charles H.; Hymson, Richard B.; and Hsu, Chi Ming L., 4,966,778, Cl. 426-19.000.
Hyon, Suong-Hyu; and Ikada, Yoshito, to Biomaterials Universe, Inc. Soft contact lens and method of manufacturing the same. 4,966,924, Cl. 523-106.000.
I & K Trading Company: *See*—
Cimock, Benjamin J., 4,967,321, Cl. 362-101.000.
Iazzi, Nadia: *See*—
Crotti, Pier L.; and Iazzi, Nadia, 4,966,867, Cl. 437-195.000.
Ibusuki, Takashi; Nakamura, Keigo; and Kutsuna, Schuzou, to Agency of Industrial Science and Technology. Method for photochemical decomposition of volatile organic chlorine compound in vent gas. 4,966,665, Cl. 204-157.300.
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, to Chisso Corporation. Ferroelectric liquid crystal mixture for guest-host type display elements. 4,966,727, Cl. 252-299.610.
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Horizontally opposed-die type edging press. 4,966,025, Cl. 72-184.000.
ICI Americas Inc.: *See*—
Lee, David L., 4,966,998, Cl. 562-869.000.
ICI Australia Limited: *See*—
Harries, Gwyn, 4,966,416, Cl. 299-13.000.
Ide, Kenichi: *See*—
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, 4,966,025, Cl. 72-184.000.
Ide, Yutaka, to Honda Giken Kogyo Kabushiki Kaisha. Stroke detection correcting system for variable displacement type compressor. 4,966,529, Cl. 417-218.000.
Idec, Eric J.; and Klimeck, Edward F., to Risdon Corporation. Cosmetic container construction. 4,966,479, Cl. 401-68.000.
Idei, Yasumasa: *See*—
Maeda, Sadahiko; Idei, Yasumasa; and Matsurra, Shinji, 4,966,101, Cl. 122-4.00D.
Idemitsu Kosan Company Limited: *See*—
Sato, Haruhito; and Tsuzuki, Masanori, 4,966,969, Cl. 544-352.000.
Ignasiak, Boleslaw L.: *See*—
Pawlak, Wanda; Janiak, Jerzy S.; Turak, Ali A.; and Ignasiak, Boleslaw L., 4,966,608, Cl. 44-624.000.
Iha, Kiyoshi: *See*—
Kitahata, Roy S.; and Iha, Kiyoshi, 4,965,905, Cl. 15-97.100.
Ihara, Masaki: *See*—
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.
Iida, Katsumi, to Diesel Kiki Co., Ltd. Air-conditioning for automobiles. 4,966,011, Cl. 62-179.000.
Iida, Katsumi, to Diesel Kiki Co., Ltd. Air-conditioner for automobile. 4,966,012, Cl. 62-180.000.
Iida, Kozo; Seto, Toru; and Obayashi, Yoshiaki, to Mitsubishi Jukogyo Kabushiki Kaisha. Catalysts for the removal of nitrogen oxides. 4,966,873, Cl. 502-84.000.
Iida, Yoshio: *See*—
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.
Iijima, Yasuo, to Kabushiki Kaisha Toshiba. Data string retrieval apparatus for IC card. 4,967,391, Cl. 364-900.000.
Iino, Tadashi, to Yazaki Corporation. Display apparatus for automotive vehicle. 4,967,191, Cl. 340-705.000.
Iizuka, Hiroshi; Iwata, Tadao; and Ishiwata, Shuichi, to Mitsui Petrochemical Industries, Ltd. Coating compositions. 4,966,790, Cl. 427-386.000.
Iizuka, Hisao: *See*—
Hirane, Hideo; Tanno, Kiyohiko; and Iizuka, Hisao, 4,967,192, Cl. 340-811.000.
Iizuka, Tsutomu; and Ikegaya, Tatsuo, to Yazaki Corporation. Fuel level gauge provided with an apparatus for issuing a warning on the amount of remaining fuel. 4,967,181, Cl. 340-450.200.
Ikada, Yoshito: *See*—
Hyon, Suong-Hyu; and Ikada, Yoshito, 4,966,924, Cl. 523-106.000.
Ikari, Akira: *See*—
Oikawa, Ryuetsu; Ikari, Akira; and Sasaki, Touru, 4,966,374, Cl. 277-178.000.
Ikeda, Chikamasa: *See*—
Saito, Masatsugu; Ikeda, Chikamasa; Takeoka, Seiei; and Katsutani, Kazuji, 4,967,178, Cl. 340-425.500.
Ikeda, Kyoichi: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Ikegaya, Tatsuo: *See*—
Iizuka, Tsutomu; and Ikegaya, Tatsuo, 4,967,181, Cl. 340-450.200.
Ikenoue, Yutaka: *See*—
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.
Ilford Limited: *See*—
Butcher, David W.; and Post, Stephen R., 4,966,440, Cl. 350-320.000.
Illel, Elieser P.: *See*—
Enchev, Ivan D.; Starev, Lyuben R.; Illel, Elieser P.; and Korudanov, Georgi N., 4,966,624, Cl. 75-10.650.
Illingworth, William J. Integral gunwale construction. 4,966,092, Cl. 114-356.000.
Imae, Kazuyoshi: *See*—
Nakamura, Tsuneo; Imae, Kazuyoshi; Deguchi, Haruhiko; and Kira, Tohru, 4,966,648, Cl. 156-643.000.
Imai, Chihiro: *See*—
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.
Imai, Mizuho: *See*—
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,967,394, Cl. 365-201.000.
Imajo, Minoru, to Nissan Motor Co., Ltd. Valve clearance adjustment. 4,966,107, Cl. 123-90.450.
Imamura, Kazunori: *See*—
Hayano, Fuminori; Imamura, Kazunori; and Murata, Sunao, 4,966,457, Cl. 356-237.000.
Imanishi Kinzoku Kogyo Kabushiki Kaisha: *See*—
Okamoto, Kenzo; and Kitada, Fumihiko, 4,967,050, Cl. 219-10.55F.
Imaseki, Takashi, to Nissan Motor Co., Ltd. Active control for distributing driving force over four-wheels of four-wheel drive vehicle. 4,966,249, Cl. 180-233.000.
Imaseki, Takashi, to Nissan Motor Co., Ltd. Active driving force control for four-wheel drive vehicle. 4,966,250, Cl. 180-233.000.
Imax Systems Corporation: *See*—
Toporkiewicz, Marian, 4,966,454, Cl. 352-59.000.
Imperial Chemical Industries plc: *See*—
Jones, Raymond V. H., 4,966,976, Cl. 548-267.800.
Imran, Mir A.: *See*—
Murrer, Edward S.; and Imran, Mir A., 4,967,305, Cl. 361-172.000.
IMS Ionen Mikrofabrikations Systeme Gesellschaft m.b.H.: *See*—
Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., 4,967,088, Cl. 250-491.100.
In Focus Systems, Inc.: *See*—
Conner, Arlie R., 4,966,441, Cl. 350-335.000.
Inaba, Yoshiharu; and Kamiguchi, Masao, to Fanuc Ltd. Mold clamping force adjustment method. 4,966,738, Cl. 264-40.500.
Inagaki, Hiroyoshi; Fukami, Masataka; and Kondo, Kenji, to Kurimoto Ltd. Low load pipe for pipe jacking. 4,966,494, Cl. 405-184.000.
Industria Farmaceutica Serono SpA: *See*—
Cerinic, Marco M.; and Marabini, Simone, 4,966,889, Cl. 514-11.000.
Industrial Technology Research Institute, R.O.C.: *See*—
Peng, Yung-Chow, 4,967,197, Cl. 341-118.000.
Ingersoll Milling Machine Company, The: *See*—
Kahley, Theodore E., 4,966,460, Cl. 356-387.000.
Ingersoll-Rand Company: *See*—
Geiger, Robert E., 4,966,474, Cl. 384-517.000.
Ingle, David M.: *See*—
Kissell, Charles L.; Selover, Jay C.; and Ingle, David M., 4,966,791, Cl. 427-389.900.
Inmos Limited: *See*—
May, Michael D., 4,967,326, Cl. 364-220.000.
Innis, Michael A.: *See*—
McCormick, Francis P.; Innis, Michael A.; and Ringold, Gordon M., 4,966,843, Cl. 435-69.510.
Inoue, Manabu: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.
Inoue, Nanao: *See*—
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.
Inoue, Noriyuki, to Fuji Photo Film Co., Ltd. Method for the formation of direct positive color images. 4,966,833, Cl. 430-378.000.

Inoue, Noriyuki; Hirano, Shigeo; Kojima, Tetsuo; and Yamamoto, Mitsuru, to Fuji Photo Film Co., Ltd. Direct positive photographic light-sensitive material. 4,966,836, Cl. 430-598.000.

Inoue, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device havii g field effect transistors. 4,967,257, Cl. 357-42.000.

Institute Po Tzvetna Metalurgia: *See*—
Enchev, Ivan D.; Starev, Lyubea R.; Illel, Elieser P.; and Korudanov, Georgi N., 4,966,624, Cl. 75-10.650.

Instrumentation Laboratory SpA: *See*—
Calzi, Claudio, 4,966,670, Cl. 204-406.000.

Intel Corporation: *See*—
Murali, Venkatesan; Wei, Chih-Shih; and Fraser, David B., 4,966,868, Cl. 437-193.000.
Sprague, David L.; and Simon, Allen H., 4,967,196, Cl. 341-67.000.

International Business Machines Corporation: *See*—
Barber, Jeffrey R.; Breiten, Charles P.; Stanasolovich, David; and Theisen, Jacob F., 4,966,870, Cl. 437-228.000.
Barish, Arnold E.; Kiesling, David A.; Mayo, Mark D.; and Svarczkopf, Walter A., 4,967,151, Cl. 324-158.00T.
Brenner, Larry B.; and VanLeer, Paul W., 4,967,353, Cl. 364-200.000.
Clarke, Kathryn E.; Drake, John E., Jr.; Pozefsky, Diane P.; and Siddall, William E., 4,967,345, Cl. 364-200.000.
Colby, Ralph S.; Doumas, William M.; Fouere, Jean-Claude; and Rectenwald, Robert M., 4,967,211, Cl. 346-160.000.
Jambotkar, Chakrapani G., 4,967,253, Cl. 357-34.000.
Lopez, Rudolph M.; Nix, James L.; and Weinstein, Robert E., 4,967,301, Cl. 360-128.000.
Ludwig, Thomas; Schettler, Helmut; Wagner, Otto M.; and Zuhlke, Rainer, 4,967,104, Cl. 307-443.000.
Lusch, Robert F.; and Dulzo, Jeffrey J., 4,967,414, Cl. 371-51.100.
Ngai, Chuck H.; Wassel, Edward R.; and Watkins, Gerald J., 4,967,343, Cl. 364-200.000.

International Electronic Research Corp.: *See*—
Butt, Sheldon H., 4,967,260, Cl. 357-70.000.

International Flavors & Fragrances Inc.: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,966,783, Cl. 426-565.000.

International Seafood Engineering, Inc.: *See*—
Ellis-Brown, Roy, 4,966,072, Cl. 99-443.00C.

International Superconductor Corp.: *See*—
Hilal, Mohammed A., 4,966,884, Cl. 505-1.000.

InterVentional Technologies Inc.: *See*—
Reiss, Robert E., 4,966,604, Cl. 606-159.000.

Iowa Industrial Hydraulics, Inc.: *See*—
Bents, Terry, 4,966,200, Cl. 138-31.000.

Iqbal, Mohammad: *See*—
Hampl, Edward F., Jr.; and Iqbal, Mohammad, 4,967,306, Cl. 361-323.000.

Irving, Edward: *See*—
Banks, Christopher P.; Irving, Edward; Renner, Alfred; and Smith, Terence J., 4,966,923, Cl. 522-167.000.

Isco, Inc.: *See*—
Allington, Robert W.; Tehrani, Abolghassem Y.; and Jones, John N., 4,966,696, Cl. 210-198.200.

Ishida, Tokuji: *See*—
Hamada, Masataka; and Ishida, Tokuji, 4,967,224, Cl. 354-402.000.

Ishida, Yukinori: *See*—
Yonechi, Shinichi; Ishida, Yukinori; and Kawase, Masaaki, 4,966,434, Cl. 350-96.230.

Ishiguro, Shiro: *See*—
Shiraki, Kazuyoshi; Ishiguro, Shiro; and Matsubara, Akinori, 4,966,052, Cl. 84-715.000.

Ishiguro, Yasuaki, to Nikon Corporation. Automatic film rewinding apparatus in a camera. 4,967,215, Cl. 354-173.100.

Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, to Toyota Jidosha Kabushiki Kaisha. Robot with controlled tool tracking displacement. 4,967,127, Cl. 318-571.000.

Ishihara, Heigo; Osaki, Akira; and Kudo, Takanori, to Hitachi Ltd. Process for producing magnetic recording medium, magnetic paint, and magnetic disk. 4,966,797, Cl. 427-64.000.

Ishihara, Hideo: *See*—
Fukasawa, Yoshiharu; Yamaguchi, Satoshi; and Ishihara, Hideo, 4,966,676, Cl. 204-298.120.

Ishii, Katsushi; and Yamazaki, Masaya, to Kabushiki Kaish Toshiba. Air-conditioner permitting comfortable sleeping during heating operation. 4,966,009, Cl. 62-160.000.

Ishii, Kenjiro; Fukumoto, Fumio; Nagata, Koichi; and Shibata, Akira, to Minolta Camera Kabushiki Kaisha. Method of photographing on microfilm and apparatus therefor. 4,967,228, Cl. 355-40.000.

Ishikawa, Takatoshi; and Ueda, Shinji, to Fuji Photo Film Co., Ltd. Method for processing a silver halide color photographic material. 4,966,834, Cl. 430-393.000.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, 4,966,025, Cl. 72-184.000.

Ishitsuka, Hideo: *See*—
Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, 4,966,891, Cl. 514-49.000.

Ishiwata, Shuichi: *See*—
Iizuka, Hiroshi; Iwata, Tadao; and Ishiwata, Shuichi, 4,966,790, Cl. 427-386.000.

Itakura, Tomiya; and Kamifuji, Hiroshi, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Fuel injection control apparatus for an internal combustion engine. 4,966,118, Cl. 123-492.000.

Ito, Isao: *See*—
Asano, Hiroaki; Haga, Kyosuke; and Ito, Isao, 4,966,268, Cl. 192-58.00C.

Ito, Kazumasa; and Hirano, Yoshide, to Sanshin Kogyo Kabushiki Kaisha. Control means of internal combustion engine for marine propulsion. 4,966,115, Cl. 123-418.000.

Ito, Ken: *See*—
Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, 4,967,359, Cl. 364-424.050.

Ito, Tsukasa; Kawakatsu, Satoshi; Onishi, Akira; and Takekoshi, Masayo, to Konishiroku Photo Industry Co., Ltd. Analytical element and the analytical method using the element. 4,966,856, Cl. 436-170.000.

Ito, Tsuyoshi: *See*—
Wada, Keisuke; Onuma, Kazuhiko; Ushikubo, Takashi; and Ito, Tsuyoshi, 4,966,966, Cl. 536-119.000.

Ito, Tunetaro: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.

Itoh, Hideki; and Takeuchi, Hitoshi, to Aisan Kogyo Kabushiki Kaisha. Fuel injection system assembly. 4,966,120, Cl. 123-516.000.

Itoh, Jinichi: *See*—
Sawai, Kenji; and Itoh, Jinichi, 4,967,128, Cl. 318-609.000.

Itou, Syunji; Suzuki, Yoshiro; and Sakaguchi, Minoru, to Hitachi, Ltd. Gas insulated switchgear apparatus. 4,967,307, Cl. 361-335.000.

ITW, Ltd.: *See*—
Hewison, George D., 4,966,024, Cl. 72-88.000.

Iwahashi, Hiroshi: *See*—
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,967,394, Cl. 365-201.000.

Iwakami, Nobuyuki: *See*—
Otake, Katsumi; and Iwakami, Nobuyuki, 4,966,285, Cl. 206-455.000.

Iwamoto, Kouichi: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Iwamoto, Kouichi, 4,967,009, Cl. 568-309.000.

Iwasa, Yoshio, to Nissan Motor Co., Ltd. Vehicle window heating apparatus. 4,967,056, Cl. 219-203.000.

Iwasa, Yoshio: *See*—
Aruga, Tatsuo; and Iwasa, Yoshio, 4,966,106, Cl. 123-90.310.

Iwasaki, Takashi; and Shimomura, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Double wishbone type suspension. 4,966,385, Cl. 280-698.000.

Iwashita, Takashi: *See*—
Suzuki, Tamotsu; Suzuki, Toyoshi; Iwashita, Takashi; and Sougawa, Masafumi, 4,965,997, Cl. 66-310.000.

Iwata, Michihiro: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.

Iwata, Tadao: *See*—
Iizuka, Hiroshi; Iwata, Tadao; and Ishiwata, Shuichi, 4,966,790, Cl. 427-386.000.

Iwatsubo, Masahito: *See*—
Aruga, Keiji; Mizoshita, Yoshifumi; Iwatsubo, Masahito; and Hatagami, Toshifumi, 4,967,293, Cl. 360-78.120.

Iwatsuki, Kunihiro; and Taniguchi, Hiroji, to Toyota Jidosha Kabushiki Kaisha. Method for controlling switching over of speed stages of transmission with presetting of due period. 4,967,355, Cl. 364-424.100.

Izumi Corporation: *See*—
Tsukamoto, Yashuhiro, 4,966,554, Cl. 439-15.000.

Izumiya, Syunzo: *See*—
Obara, Haruki; and Izumiya, Syunzo, 4,967,054, Cl. 219-69.130.

J. I. Case Company: *See*—
Bowman, Barry A.; Jeziorski, Stanley J.; Peterson, Francis A.; and Price, Ralph D., 4,966,044, Cl. 74-335.000.
Brekkestran, Kevin L.; and Thoma , John C., 4,967,385, Cl. 364-571.030.

Jack, Alister. Sliding clamp for a binder having flexible binding prongs. 4,966,485, Cl. 402-16.000.

Jackson, John, to University of Strathclyde, The. Apparatus for monitoring physiological parameters. 4,966,155, Cl. 128-671.000.

Jacob, Werner. Bearing assembly for a wheel of a motor vehicle. 4,966,473, Cl. 384-477.000.

Jacobs, Harold J. Brier cutter and method of use thereof. 4,965,992, Cl. 56-241.000.

Jacobs, Randall W.; and Peterson, Robert H., to Baxter International Inc. Surgical drape for applying traction. 4,966,167, Cl. 128-849.000.

Jagenberg Aktiengesellschaft: *See*—
Sommer, Herbert, 4,966,093, Cl. 118-126.000.

Jahns, Jurgen: *See*—
Huang, Alan; and Jahns, Jurgen, 4,966,446, Cl. 350-417.000.
Huang Alan; and Jahns, Jurgen, 4,966,447, Cl. 350-417.000.

Jakobi, Ralf: *See*—
Schiel, Lothar; Jakobi, Ralf; and Bauer, Juergen, 4,966,420, Cl. 303-114.000.

Jakse, Frank P.: *See*—
Heidolph, Barbara B.; and Jakse, Frank P., 4,966,782, Cl. 426-551.000.

Jambotkar, Chakrapani G., to International Business Machines Corporation. Bipolar transistor integrated circuit technology. 4,967,253, Cl. 357-34.000.

James River Graphics, Inc.: *See*—
Anderson, Nils T.; and Katsen, Boris J., 4,966,883, Cl. 503-208.000.

Jamieson, Donald F.; and Cardinal, Paul J., to Austgen Biojet Holdings Pty. Ltd. Waste water treatment plant and process. 4,966,705, Cl. 210-605.000.

Jamous, Saad A.; and Hoffman, Stephen W., to Ford Motor Company. Read/write random access memory with data prefetch. 4,967,398, Cl. 365-230.050.

Janashak, Robert: *See*—
Seme, Joseph P., Jr.; Balog, Charles R.; and Janashak, Robert, 4,966,504, Cl. 409-140.000.

Janda, Helmut: *See*—
Kaustrater, Gert; Jorg, Josef; and Janda, Helmut, 4,966,064, Cl. 89-46.000.

Janiak, Jerzy S.: *See*—
Pawlak, Wanda; Janiak, Jerzy S.; Turak, Ali A.; and Ignasiak, Boleslaw L., 4,966,608, Cl. 44-624.000.

Janome Sewing Machine Co. Ltd.: *See*—
Hanyu, Susumu; and Ninomiya, Masashi, 4,966,089, Cl. 112-444.000.

Janson, David A.; Glinski, Jerome V., Jr.; and Preston, David M., to Eaton Corporation. Four wheel steering system. 4,966,246, Cl. 180-140.000.

Japan Aviation Electronics Industry, Inc.: *See*—
Kumazawa, Hiroshi, 4,965,923, Cl. 29-566.300.

Jarabak, Beverly T.: *See*—
John, Clarence D., Jr.; Jarabak, Beverly T.; and Cigich, Joseph G., 4,966,177, Cl. 134-61.000.

Jarocki, George J.: *See*—
Credle, William S., Jr.; Rudick, Arthur G.; and Jarocki, George J., 4,966,306, Cl. 222-1.000.

Jaron, Michael; and Melinyshyn, Lev, to Uresil Corporation. One-way valve. 4,966,197, Cl. 137-846.000.

Jarrold, Gregory S.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,085, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,087, Cl. 250-483.100.

Jaster, Heinz; and Besaler, Warren F., to General Electric Company. Apparatus for controlling a dual evaporator, dual fan refrigerator with independent temperature controls. 4,966,010, Cl. 62-179.000.

Jean-Jacques, Leonard; and Sutherland, John N., to Jean-Jacques, Leonard. Roof mounting. 4,965,971, Cl. 52-199.000.

Jenkner, Erwin. Apparatus for conveying a transport platform to a lifting table of a stacking station. 4,966,271, Cl. 198-409.000.

Jesperson, Bruce L.: *See*—
Jesperson, Leslie S.; and Jesperson, Bruce L., 4,965,982, Cl. 53-248.000.

Jesperson, Leslie S.; and Jesperson, Bruce L. Fruit bin filler. 4,965,982, Cl. 53-248.000.

Jeziorski, Stanley J.: *See*—
Bowman, Barry A.; Jeziorski, Stanley J.; Peterson, Francis A.; and Price, Ralph D., 4,966,044, Cl. 74-335.000.

Jidosha Kiki Co., Ltd.: *See*—
Takaku, Hitoshi, 4,966,512, Cl. 411-181.000.

Jim Fleming Communications: *See*—
Fleming, Jim, 4,966,319, Cl. 224-207.000.

Jirkovsky, Ivo L.: *See*—
Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 4,966,905, Cl. 514-314.000.

Johansson, Bertil; and Hasselstrom, Per, to Uddeholm Tooling Aktiebolag. Method to consolidate a metal powder body and forging produced by the method. 4,966,818, Cl. 482-558.000.

Johansson, Lasse; and Astrand, Erik, to Oy Partek AB. Mineral wool centrifuge. 4,966,616, Cl. 65-14.000.

John, Clarence D., Jr.; Jarabak, Beverly T.; and Cigich, Joseph G., to Westinghouse Electric Corp. Ultrasonic tube cleaning system. 4,966,177, Cl. 134-61.000.

John, Thomas, to MAN Roland Druckmaschinen AG. System for releasably coupling a stub shaft extending from a printing cylinder to a shaft passing through a machine side wall. 4,966,076, Cl. 101-216.000.

Johnson, Alan S., to Red Devil, Inc. Vibratory mixers. 4,966,467, Cl. 366-209.000.

Johnson, Donald A.: *See*—
Hoots, John E.; Banks, Rodney H.; and Johnson, Donald A., 4,966,711, Cl. 210-697.000.

Johnson, James N., Jr. Trailer for transporting golf carts and the like. 4,966,510, Cl. 410-26.000.

Johnson, Larry K.: *See*—
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greese, Paul J.; and Johnson, Larry K., 4,966,947, Cl. 525-327.690.

Johnson, Melissa C.; and Howitt, Robert, to Johnson, Melissa C. Adjustable apparel-held flashlight. 4,967,323, Cl. 362-103.000.

Johnson, Oliver W.: *See*—
Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 4,967,362, Cl. 364-424.070.

Johnson, Paul R.; and Lassow, Eliot S., to Howmet Corporation. Ceramic shell mold for investment casting and method of making the same. 4,966,225, Cl. 164-519.000.

Johnson, Robert G.: *See*—
Sumner, John P.; Johnson, Robert G.; and Higashi, Robert E., 4,966,037, Cl. 73-204.260.

Johnson, Willard L. Cross flow filter method. 4,966,718, Cl. 210-776.000.

Johnston, Jerome E.: *See*—
Molinar, Tommy B.; and Johnston, Jerome E., 4,967,384, Cl. 364-567.000.

Johnston, Lowell E. Battery assembly. 4,966,822, Cl. 429-62.000.

Jones, August C. Insulated beverage container securement apparatus. 4,966,303, Cl. 220-411.000.

Jones, Derrell G.: *See*—
Ejchler, Henry; and Jones, Derrell G., 4,966,290, Cl. 212-258.000.

Jones, John N.: *See*—
Allington, Robert W.; Tehrani, Abolghassem Y.; and Jones, John N., 4,966,696, Cl. 210-198.200.

Jones, Larry O.: *See*—
Young, David A.; Jones, Larry O.; and Campione, Troy J., 4,966,874, Cl. 502-117.000.

Jones, Raymond V. H., to Imperial Chemical Industries plc. Isomerization process. 4,966,976, Cl. 548-267.800.

Jones, Stacye C. Surrogate nursing bib. 4,965,888, Cl. 2-104.000.

Jorg, Josef: *See*—
Kaustrater, Gert; Jorg, Josef; and Janda, Helmut, 4,966,064, Cl. 89-46.000.

Joshua, Henry. High pressure liquid chromatography column jacket. 4,966,695, Cl. 210-198.200.

Jourjine, Alexander N. Variable capacity transmission medium. 4,967,369, Cl. 364-513.000.

Junkosha Co., Ltd.: *See*—
Hoshiko, Takeshi, 4,966,886, Cl. 505-1.000.

Kabushiki Kaish Toshiba: *See*—
Ishii, Katsushi; and Yamazaki, Masaya, 4,966,009, Cl. 62-160.000.

Kabushiki Kaisha Ishida Koki Seisakusho: *See*—
Sashiki, Takashi, 4,966,273, Cl. 198-601.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Fujimoto, Yoshiaki, 4,966,113, Cl. 123-359.000.
Sato, Yoshiki; Yamamoto, Yoshitaka; Mito, Yutaka; and Tanabe, Harumasa, 4,966,978, Cl. 548-469.000.

Kabushiki Kaisha Meidensha: *See*—
Ashikaga, Tadashi; and Nomura, Masakatsu, 4,967,135, Cl. 318-808.000.

Kabushiki Kaisha Nagano Keiki Seisakusho: *See*—
Uchida, Akito; and Sakaguchi, Iwao, 4,966,533, Cl. 417-413.000.

Kabushiki Kaisha Sakamurakikai Seisakusho: *See*—
Sakamura, Yoshikazu; and Higuchi, Sumitada, 4,966,028, Cl. 72-361.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Sawai, Kenji; and Itoh, Jinichi, 4,967,128, Cl. 318-609.000.

Kabushiki Kaisha Shinkoseisakusho: *See*—
Yokoi, Takao, 4,966,573, Cl. 475-164.000.

Kabushiki Kaisha Toshiba: *See*—
Fukasawa, Yoshiharu; Yamaguchi, Satoshi; and Ishihara, Hideo, 4,966,676, Cl. 204-298.120.
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.
Iijima, Yasuo, 4,967,391, Cl. 364-900.000.
Katsuma, Takashi; Mori, Hideo; Shimaohgi, Toshio; and Umezu, Naoaki, 4,967,120, Cl. 315-382.000.
Kinoshita, Hideaki; and Tanaka, Toshiaki, 4,967,241, Cl. 357-19.000.
Mikata, Yuuichi; and Samata, Shuichi, 4,966,866, Cl. 437-193.000.
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,967,394, Cl. 365-201.000.
Mizutori, Youichi; and Sasaki, Takanori, 4,967,288, Cl. 358-425.000.
Muragana, Tetsuro; and Tsutsumitake, Hideyuki, 4,967,371, Cl. 364-513.000.
Sanbayashi, Takeshi, 4,967,235, Cl. 355-271.000.
Watanabe, Yohji; and Furuyama, Tohru, 4,967,395, Cl. 365-205.000.
Yamazaki, Mitsuki, 4,967,058, Cl. 219-221.000.
Yokoyama, Sadayuki; and Nakagawa, Kaoru, 4,967,393, Cl. 365-185.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Suzuki, Shigeru; Ohshiro, Katsuhiko; and Watanabe, Yasushi, 4,966,531, Cl. 417-295.000.

Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo: *See*—
Ueno, Ryuzo; Masada, Yoshiyasu; Kuwae, Yoshihiko; and Kawata, Keiji, 4,966,992, Cl. 562-424.000.

Kadota, Kuninobu, to Bridgestone Corporation. High inner pressure heavy duty pneumatic radial tire including folded belt layers. 4,966,214, Cl. 152-528.000.

Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, to Aichi Steel Works, Limited; and Toyota Jidosha Kabushiki Kaisha. Steel having good wear resistance. 4,966,751, Cl. 420-34.000.

Kaehler, David L., to Gilbarco Inc. Integrated gasoline dispenser and POS authorization system with unattached pin pad. 4,967,366, Cl. 364-479.000.

Kaga, Toru; Kawamoto, Yoshifumi; and Sunami, Hideo, to Hitachi, Ltd. Vertical dynamic random access memory. 4,967,247, Cl. 357-23.600.

Kaga, Yuzou: *See*—
Tanaka, Toyoyasu; Yamamoto, Yasuyoshi; and Kaga, Yuzou, 4,965,904, Cl. 15-97.100.

Kagami, Manabu: *See*—
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, 4,966,432, Cl. 350-96.150.

Kahley, Theodore E., to Ingersoll Milling Machine Company, The. Laser gauging of rotary cutting tools. 4,966,460, Cl. 356-387.000.

Kahonen, Hannu: *See*—
Karna, Toivo; Nieminen, Jukka-Pekka; Maisti, Asko; and Kahonen, Hannu, 4,966,346, Cl. 248-503.000.
Kairis, Alexander: *See*—
Colsen, Ronnie; Kairis, Alexander; and Deller, Andrew L., 4,966,164, Cl. 128-789.000.
Kaise, Tatsuo: *See*—
Matsuda, Shoichi; Suzuki, Akira; and Kaise, Tatsuo, 4,966,853, Cl. 435-284.000.
Kajigaya, Kazuhiko; and Tsuchiya, Osamu, to Hitachi, Ltd. Semiconductor integrated circuit device. 4,967,396, Cl. 365-207.000.
Kalmar, Istvan: *See*—
Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, 4,966,349, Cl. 266-276.000.
Kalnins, Charles M.; Tuckett, Phillip C.; and Hansen, Soren R. Z., to Conoco Specialty Products Inc. Cyclone separator. 4,966,703, Cl. 210-512.100.
Kalt, Glenda G., to Kalt Medical Corporation. IV Clamp with membrane dressing. 4,966,590, Cl. 604-180.000.
Kalt Medical Corporation: *See*—
Kalt, Glenda G., 4,966,590, Cl. 604-180.000.
Kaman Aerospace Corporation: *See*—
Ulich, Bobby L.; Keeler, R. Norris; and Phlibsen, Kent, 4,967,270, Cl. 358-95.000.
Kamath, Hundi P.: *See*—
Horsma, David A.; Kamath, Hundi P.; and Fang, Shou-Mean, 4,967,176, Cl. 338-22.00R.
Kamei, Kiyohiro: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, 4,966,281, Cl. 206-330.000.
Kamei, Ryosuke: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,966,809, Cl. 428-323.000.
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, to Nippon Shokubai Kagaku Kogyo Co. Ltd. Process for producing aziridines. 4,966,980, Cl. 548-954.000.
Kamifuji, Hiroshi: *See*—
Itakura, Tomiya; and Kamifuji, Hiroshi, 4,966,118, Cl. 123-492.000.
Kamiguchi, Masao: *See*—
Inaba, Yoshiharu; and Kamiguchi, Masao, 4,966,738, Cl. 264-40.500.
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, to Fuji Jukogyo Kabushiki Kaisha. Active-suspension controlling system of vehicles. 4,967,361, Cl. 564-424.050.
Kammerer, Gerald A.: *See*—
Scavezze, Daniel C.; Leeser, Miriam E.; Kammerer, Gerald A.; and Prescott, William R., 4,967,344, Cl. 364-200.000.
Kanase, Kiyoshi: *See*—
Onodera, Nobuo; Nanjo, Katsumi; Kariya, Akinori; and Kanase, Kiyoshi, 4,966,896, Cl. 514-469.000.
Kanaya, Yasuhiko: *See*—
Otani, Tamio; Nishigai, Masao; and Kanaya, Yasuhiko, 4,966,508, Cl. 409-189.000.
Kanazawa, Yukio: *See*—
Hirosawa, Kouzou; and Kanazawa, Yukio, 4,966,714, Cl. 210-708.000.
Kand M Electronics: *See*—
Schmidt, Kenneth C.; and Knak, James L., 4,967,115, Cl. 313-103.0CM.
Kanda, Yukio: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhsahi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Tagachi, Toshio, 4,966,659, Cl. 204-28.000.
Kandybowski, Steven J.: *See*—
Barkus, Lee A.; Kandybowski, Steven J.; and Sinisi, David B., 4,966,557, Cl. 439-246.000.
Kane, John M.; and Miller, Francis P., to Merrell Dow Pharmaceuticals. 4-benzyl-5-phenyl-2,4-dihydro-3H-1,2,4-triazol-3-ones and their use as anticonvulsants. 4,966,909, Cl. 514-359.000.
Kaneda, Shinichi: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.
Kaneko, Kiyotaka; Miyake, Izumi; Nakane, Yoshio; and Shimaya, Hiroshi, to Fuji Photo Film Co., Ltd. Magnetic recording/reproducing device which discriminates recorded and unrecorded tracks. 4,967,294, Cl. 360-78.130.
Kaneko, Kyoichi, to Daiwa Seiko Inc. Speed changer for fishing reels. 4,966,335, Cl. 242-255.000.
Kaneko, Syuzoh: *See*—
Okutsu, Mitsuhiko; Kariya, Tadaaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.
Kaneko, Tetsuya: *See*—
Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Kenichi, 4,966,994, Cl. 562-554.000.
Kaneko, Toyokazu: *See*—
Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Kenichi, 4,966,994, Cl. 562-554.000.
Kaneshiro, Tetuya; and Tanabe, Takeshi, to Sharp Kabushiki Kaisha. Adjusting member for a temperature sensing probe. 4,967,049, Cl. 219-10.55B.
Kann, Gary: *See*—
Liberman, Michael; and Kann, Gary, 4,966,181, Cl. 135-87.000.
Kanno, Masahide: *See*—
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.
Kanota, Keiji; and Murabayashi, Noboru, to Sony Corporation. PCM signal recording apparatus. 4,967,289, Cl. 360-46.000.
Kao Corporation: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.
Kao, Yih-Sien; and Lee, Lin-nan, to Communications Satellite Corporation. Bandwidth reduction and multiplexing of multiple component TV signals. 4,967,272, Cl. 358-135.000.
Kaplan, Alvaro: *See*—
Zimmerman, George O.; and Kaplan, Alvaro, 4,966,142, Cl. 228-263.120.
Kaplinsky, Cecil H., to Plus Logic, Inc. Programmable logic expander. 4,967,107, Cl. 307-465.000.
Karaki, Koichi: *See*—
Sakai, Mitsugu; Karaki, Koichi; and Sasaki, Yasuo, 4,966,038, Cl. 73-606.000.
Karasik, Alexander; and Oron, David, to Soldon Achzakot (1990) Ltd. Cover device for motor vehicles. 4,966,406, Cl. 296-98.000.
Karcher, Michael; Eckhardt, Heinz; and Henkelmann, Jochem, to BASF Aktiengesellschaft. Polytetrahydrofuran vinyl ethers. 4,967,015, Cl. 568-616.000.
Kariya, Akinori: *See*—
Onodera, Nobuo; Nanjo, Katsumi; Kariya, Akinori; and Kanase, Kiyoshi, 4,966,896, Cl. 514-469.000.
Kariya, Tadaaki: *See*—
Okutsu, Mitsuhiko; Kariya, Tadaaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.
Karna, Toivo; Nieminen, Jukka-Pekka; Maisti, Asko; and Kahonen, Hannu, to Neste OY. Mounting fixture for storage battery. 4,966,346, Cl. 248-503.000.
Kasado Kikai Co., Ltd.: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Kaspar, Klaus P., to Boehringer Mannheim GmbH. Process for the determination of an immunologically bindable analyte. 4,966,839, Cl. 435-7.000.
Kast, Michael A.: *See*—
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, 4,967,061, Cl. 219-438.000.
Katafuchi, Toshinobu; and Hamakawa, Hiroyuki, to Mita Industrial Co., Ltd. Copying paper feeding device for an alignment tray of a copy machine. 4,966,355, Cl. 271-3.100.
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, to Kokuyo Co., Ltd.; and Takano Co., Ltd. Chair provided with a backrest. 4,966,411, Cl. 297-301.000.
Katamine, Tosinori: *See*—
Sadamori, Masaaki; Haze, Kenji; and Katamine, Tosinori, 4,966,669, Cl. 204-192.120.
Katayama, Kazuyori: *See*—
Mimura, Munehiko; Tatumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,967,357, Cl. 364-426.040.
Kathmann, Franz: *See*—
Ewert, Alfred; and Kathmann, Franz, 4,967,318, Cl. 362-61.000.
Kato, Hiroshi: *See*—
Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, 4,966,679, Cl. 208-58.000.
Kato, Kiyoshi: *See*—
Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, 4,966,679, Cl. 208-58.000.
Kato, Kozo: *See*—
Hayakawa, Youichi; Hosono, Chihiro; Nishida, Masaaki; and Kato, Kozo, 4,966,264, Cl. 192-3.340.
Kato, Shinji: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.
Kato, Tamotu: *See*—
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, to Babcock-Hitachi Kabushiki Kaisha. Catalyst for denitration by catalytic reduction using ammonia and a process for producing the same. 4,966,882, Cl. 502-309.000.
Kato, Yoshito: *See*—
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.
Katoh, Kazuo: *See*—
Nakano, Michinobu; and Katoh, Kazuo, 4,966,774, Cl. 424-601.000.
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, to Hitachi, Ltd. Thin-film magnetic head with a plurality of transducers. 4,967,299, Cl. 360-121.000.
Katsen, Boris J.: *See*—
Anderson, Nils T.; and Katsen, Boris J., 4,966,883, Cl. 503-208.000.

Katsuki, Manabu: *See*—
Furuhata, Takashi; Takahashi, Hiroaki; and Katsuki, Manabu, 4,967,161, Cl. 328-22.000.

Katsuma, Takashi; Mori, Hideo; Shimaohgi, Toshio; and Umezu, Naoaki, to Kabushiki Kaisha Toshiba. Electron gun assembly of color ray tube. 4,967,120, Cl. 315-382.000.

Katsura, Koyo, to Hitachi, Ltd. Method for displaying characters and/or figures in a computer graphics and apparatus thereof. 4,967,376, Cl. 364-521.000.

Katsutani, Kazuji: *See*—
Saito, Masatsugu; Ikeda, Chikamasa; Takeoka, Seiei; and Katsutani, Kazuji, 4,967,178, Cl. 340-425.500.

Kaufman, Jerry M., to Hemedix International, Inc. Intravenous catheter placement device. 4,966,589, Cl. 604-174.000.

Kausek, James H. Knee brace for control of ligament stability. 4,966,133, Cl. 128-80.00C.

Kauss, Wolfgang; Muncke, Ludwig; Radtke, Dietrich; and Wittich, Kurt, to Mannesmann Rexroth GmbH. Load sensing system with increasing priority in series of control valves. 4,966,066, Cl. 91-516.000.

Kaustrater, Gert; Jorg, Josef; and Janda, Helmut, to Kuka Wehrtechnik GmbH. Armoured car. 4,966,064, Cl. 89-46.000.

Kavlico Corporation: *See*—
Park, Kyong; Nassar, Marcos A.; and Sun, Cliff C., 4,967,071, Cl. 250-227.210.

Kawabata, Katsuhiko: *See*—
Watanabe, Hitosi; Takagishi, Ikuo; Kosaka, Toshinobu; and Kawabata, Katsuhiko, 4,966,480, Cl. 401-134.000.

Kawabuchi, Masami: *See*—
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 4,966,153, Cl. 128-661.090.

Kawaguchi, Yasuyoshi; Ohashi, Masayuki; and Tansei, Hikaru, to Bridgestone Corporation. Pneumatic tires with apertured puncture sealing layer. 4,966,213, Cl. 152-504.000.

Kawai, Michio: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.

Kawakami, Ken-ichi; Murakami, Masatsugi; and Takuwa, Kenji, to Toray Industries, Inc. Propylene polymer film. 4,966,933, Cl. 524-310.000.

Kawakami, Shigenobu: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,967,028, Cl. 585-6.300.

Kawakatsu, Satoshi: *See*—
Ito, Tsukasa; Kawakatsu, Satoshi; Onishi, Akira; and Takekoshi, Masayo, 4,966,856, Cl. 436-170.000.

Kawamoto, Kouji: *See*—
Okutsu, Mitsuhiko; Kariya, Tadaaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.

Kawamoto, Yoshifumi: *See*—
Kaga, Toru; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,967,247, Cl. 357-23.600.

Kawamura, Mamoru: *See*—
Masamoto, Junzo; Ohtake, Junzo; and Kawamura, Mamoru, 4,967,014, Cl. 568-458.000.

Kawamura, Yoshihisa, to Nissan Motor Company, Limited. System and method for controlling ignition timing for vehicular internal combustion engine. 4,966,117, Cl. 123-425.000.

Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, to Nitto Denko Corporation. Electronic component carrier. 4,966,281, Cl. 206-330.000.

Kawanishi, Michirou; Aizawa, Kaoru; and Kurono, Tatsuo, to Nitto Denko Corporation. Electronic component carrier. 4,966,282, Cl. 206-330.000.

Kawano, Michinori, to Chisso Corporation. Micro-fibers-generating conjugate fibers and woven or non-woven fabric thereof. 4,966,808, Cl. 428-224.000.

Kawano, Saburo: *See*—
Taguchi, Masaru; Kuroki, Yasuhiro; Uchida, Yoshiharu; and Kawano, Saburo, 4,966,540, Cl. 425-208.000.

Kawasaki, Iwao: *See*—
Saeki, Kenshi; Kawasaki, Iwao; Shikaze, Yoshikazu; and Sugaya, Mamoru, 4,966,634, Cl. 148-251.000.

Kawasaki, Kiyohito; Umezawa, Yujiro; and Sugawara, Toshio, to Bridgestone Corporation. Heavy duty radial tires with metallic carcass ply. 4,966,216, Cl. 152-556.000.

Kawasaki, Masaaki: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.

Kawase, Masaaki: *See*—
Yonechi, Shinichi; Ishida, Yukinori; and Kawase, Masaaki, 4,966,434, Cl. 350-96.230.

Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics Co., Ltd. Perpendicular magnetic recording medium. 4,966,821, Cl. 428-694.000.

Kawata, Keiji: *See*—
Ueno, Ryuzo; Masada, Yoshiyasu; Kuwae, Yoshihiko; and Kawata, Keiji, 4,966,992, Cl. 562-424.000.

Ke, Charles H.: *See*—
Benjamin, Earl J.; Ke, Charles H.; Hynson, Richard B.; and Hsu, Chi Ming L., 4,966,778, Cl. 426-19.000.

Keefer, Colin R., to Harrison Electronic Systems, Inc. Vertically-mountable pin switch. 4,967,045, Cl. 200-296.000.

Keeler, R. Norris: *See*—
Ulich, Bobby L.; Keeler, R. Norris; and Philbeen, Kent, 4,967,270, Cl. 358-95.000.

Keene, Joseph P.: *See*—
Howard, Richard E.; and Keene, Joseph P., 4,966,207, Cl. 141-98.000.

Keeney, L. Douglas: *See*—
Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 4,966,169, Cl. 131-31.000.

Keida, Haruo; Tsukamoto, Takashi; and Nagasaki, Nobutaka, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering Ltd. Data processor in which external sync signal may be selectively inhibited. 4,967,352, Cl. 364-200.000.

Kelly, Edward C., to Lamba-Beta-Epsilon Group. Bill money changer for slot machines. 4,966,304, Cl. 221-6.000.

Kelsall, Thomas W., to Kue Engineering Limited. Blast cleaning. 4,965,968, Cl. 51-410.000.

Kemp, James M.: *See*—
Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., 4,965,933, Cl. 29-882.000.

Kenp, Richard A., to Shell Oil Company. Alkoxylation process catalyzed by barium phosphate. 4,967,016, Cl. 568-618.000.

Kendall Company: *See*—
Dye, John F., 4,966,396, Cl. 285-136.000.

Keneko, Kenji: *See*—
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, 4,967,349, Cl. 364-200.000.

Kerby, Keith A.: *See*—
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., 4,966,299, Cl. 220-85.0VR.

Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., to Philip Morris Incorporated. Tobacco processing. 4,966,170, Cl. 131-88.000.

Kern, Donald W. Ozone injection system and method. 4,966,717, Cl. 210-760.000.

Kern, Manfred: *See*—
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.

Keshavan, Madapusi K.; and Rey, Proserfina C., to Smith International, Inc. Composite cemented carbide. 4,966,627, Cl. 75-240.000.

Keys, Daniel W.; and Burgin, Grady W., to FMC Corporation. Process for the treatment of waste water from food processing plants. 4,966,713, Cl. 210-705.000.

Khan, Abdus S.: *See*—
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., 4,966,229, Cl. 165-41.000.

Khoury, Issam A.; Heistand, Robert H., II; and Kohatsu, Iwao. Preparation of thin ceramic sheets. 4,966,742, Cl. 264-166.000.

Kiang, Wo-hster W., to Quantum Chemical Corporation. Impact propylene co$_4$olymers with improved bruise resistance. 4,966,944, Cl. 525-88.000.

Kieser, Jorg: *See*—
Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, 4,966,677, Cl. 204-298.210.

Kiesling, David A.: *See*—
Barish, Arnold E.; Kiesling, David A.; Mayo, Mark D.; and Svarczkopf, Walter A., 4,967,151, Cl. 324-158.00T.

Kietzer, James E., to United States of America, Navy. Combined limiting/AGC IF system. 4,967,163, Cl. 330-86.000.

Kiguchi, Masashi; and Murayama, Yoshimasa, to Hitachi, Ltd. Method of taking out and storing energy in a superconductive ring or coil. 4,967,141, Cl. 323-360.000.

Kikuchi, Kenichi: *See*—
Takuma, Masao; Haruki, Toshinobu; and Kikuchi, Kenichi, 4,967,280, Cl. 358-227.000.

Kikuchi, Kouichi, to Kyowa Machinery Co., Ltd. Shifting apparatus for objects such as eggs. 4,965,981, Cl. 53-142.000.

Kikuchi, Makoto: *See*—
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,966,727, Cl. 252-299.610.

Kikuko, Akimoto: *See*—
Setsuko, Takahashi; Kikuko, Akimoto; Kumiko, Mori; and Ryozo, Akama, 4,966,660, Cl. 204-34.000.

Kikumoto, Makoto; Moroto, Masakazu; and Osumi, Masato, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Automatic body temperature adjuster. 4,966,145, Cl. 128-377.000.

Kilgore, Michael A.: *See*—
English, Roe E.; Kilgore, Michael A.; and Crone, Jerry A., 4,967,337, Cl. 364-184.000.

Killarney, Declan E., to Eaton Corporation. Absorbing overtravel in sequential switching. 4,967,043, Cl. 200-1.00B.

Kim, In S. Electronic motor starter. 4,967,131, Cl. 318-786.000.

Kim, Tai K.; and McClintic, Robert P., to GTE Products Corporation. Method for removing magnesium and calcium from sodium sulfate solutions. 4,966,710, Cl. 210-665.000.

Kim, Yong J.: *See*—
Genske, Roger P.; and Kim, Yong J., 4,966,795, Cl. 428-34.300.

Kimura, Masaru; Konose, Yoshiomi; and Nakamura, Yuji, to Mitsubishi Pencil Co., Ltd. Hair cosmetics coating tool. 4,966,175, Cl. 132-112.000.

Kimura, Masaru, to Mitsubishi Pencil Co., Ltd. Tool for applying hair tonic and the like. 4,966,484, Cl. 401-273.000.

Kimura, Tsutomu: *See*—
Shuji, Ono; Kimura, Tsutomu; and Takasaki, Yoshimi, 4,967,073, Cl. 250-235.000.
King, Edward: *See*—
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,966,458, Cl. 356-328.000.
King Jim Co., Inc.: *See*—
Mizutani, Satoshi; and Nakada, Hiroaki, 4,966,486, Cl. 402-68.000.
Kinoshita, Hideaki; and Tanaka, Toshiaki, to Kabushiki Kaisha Toshiba. Semiconductor light emitting device. 4,967,241, Cl. 357-19.000.
Kira, Tohru: *See*—
Nakamura, Tsuneo; Imae, Kazuyoshi; Deguchi, Haruhiko; and Kira, Tohru, 4,966,648, Cl. 156-643.000.
Kirby, Norman R., to Utility Structural Systems. Method of setting, resetting and protecting poles in the ground with foam polyurethane resins. 4,966,497, Cl. 405-232.000.
Kirchhoffer, Johann: *See*—
Schulz, Winfried; Kirchhoffer, Johann; and Graef, Kurt, 4,966,050, Cl. 74-867.000.
Kirin Beer Kabushiki Kaisha: *See*—
Matsuda, Shoichi; Suzuki, Akira; and Kaise, Tatsuo, 4,966,853, Cl. 435-284.000.
Kirk, Paula S., to BASF Corporation. Stable, water miscible emulsion comprising a fat-soluble vitamin. 4,966,779, Cl. 426-72.000.
Kirkham, Paul W. Valve train organizer. 4,966,288, Cl. 211-60.100.
Kissell, Charles L.; Selover, Jay C.; and Ingle, David M., to Union Oil Company of California. Methods for manufacturing textile materials. 4,966,791, Cl. 427-389.900.
Kitada, Fumihiko: *See*—
Okamoto, Kenzo; and Kitada, Fumihiko, 4,967,050, Cl. 219-10.55F.
Kitagawa Industries Company, Ltd.: *See*—
Fujimoto, Nobuaki, 4,966,482, Cl. 403-24.000.
Kitagawa, Katugi; Akutagawa, Ichiro; and Ono, Kazuya, to Somar Corporation. Epoxy resin based powder coating composition. 4,966,928, Cl. 523-437.000.
Kitahara, Takumi: *See*—
Hashimoto, Isao; Yokoyama, Keiichi; and Kitahara, Takumi, 4,966,968, Cl. 544-176.000.
Kitahata, Roy S.; and Iha, Kiyoshi, to Chamberlain Group, The. Apparatus for waxing and polishing. 4,965,905, Cl. 15-97.100.
Kitajima, Hiroyuki: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, to Minolta Camera Kabushiki Kaisha. Recording apparatus. 4,967,240, Cl. 355-318.000.
Kitazawa, Shooji: *See*—
Kuwabara, Hiroshi; and Kitazawa, Shooji, 4,967,399, Cl. 365-230.060.
Kitazawa, Yasunori: *See*—
Sakaguchi, Masatoshi; and Kitazawa, Yasunori, 4,967,205, Cl. 346-76.0PH.
Kitchener Forging Ltd.: *See*—
Bisch, Christoher G., 4,965,903, Cl. 14-1.000.
Kiuchi, Masayoshi: *See*—
Nishio, Tetsuya; Kiuchi, Masayoshi; and Ohara, Tsunemasa, 4,967,216, Cl. 354-173.100.
Kiyohara, Tokuzo; and Deguchi, Masashi, to Matsushita Electric Industrial Co., Ltd. Loosely coupled pipeline processor. 4,967,338, Cl. 364-200.000.
Kiyohara, Toshimi: *See*—
Narumiya, Masao; and Kiyohara, Toshimi, 4,967,409, Cl. 370-085.600.
Nomura, Akihiro; and Kiyohara, Toshimi, 4,967,374, Cl. 364-518.000.
Klausener, Alexander; Paulus, Wilfried; Schmitt, Hans-Georg; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. 2-phenylsulphinyl-nitro-pyridines, and their use as fungicides. 4,966,974, Cl. 546-294.000.
Kleemann, Axel: *See*—
Giray, Guenes; Huthmacher, Klaus; Kleemann, Axel; and Lied, Thomas, 4,966,732, Cl. 260-399.000.
Klein, Manfred: *See*—
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittenbring, Gerhard, 4,966,269, Cl. 192-70.160.
Klein, Roland: *See*—
Muller, Roland; Gries, Manfred; and Klein, Roland, 4,965,983, Cl. 53-435.000.
Klement, Ekkehard: *See*—
Droegemueller, Karsten; Mayerhofer, Franz; Klement, Ekkehard; and Deserno, Ulrich, 4,966,444, Cl. 350-376.000.
Klepacki, Brian J. Stirrup adapter assembly. 4,966,351, Cl. 269-328.000.
Klimeck, Edward F.: *See*—
Idec, Eric J.; and Klimeck, Edward F., 4,966,479, Cl. 401-68.000.
Kling, Miguel F.: *See*—
Miller, Jorge P.; and Kling, Miguel F., 4,967,034, Cl. 585-446.000.
Klinkel, Wolfgang. Apparatus for forming, filling and sealing bag-type packages. 4,965,986, Cl. 53-551.000.
Kloeckl, Terrance L.: *See*—
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, 4,967,061, Cl. 219-438.000.
Klos-Hein, Karl; and Rumpf, Horst H., to U.S. Philips Corporation. Arrangement for controlling the position of the head mounting plate in a magnetic tape apparatus. 4,967,036, Cl. 74-54.000.
Klutiermann, Jurgen; and Mosges, Helmut P., to Trutzschler GmbH & Co. KG. Method and apparatus for severing the sliver in sliver coilers. 4,965,912, Cl. 19-159.00R.
Knak, James L.: *See*—
Schmidt, Kenneth C.; and Knak, James L., 4,967,115, Cl. 313-103.0CM.
Knape & Vogt Manufacturing Company: *See*—
Bessinger, Walter L.; Stumpf, William E.; and Carlson, Casey L., 4,966,343, Cl. 248-243.000.
Knapp, Alfons; and Buzzi, Gunter, to Masco Corporation of Indiana. Process of manufacturing seal members having a low friction coefficient. 4,966,789, Cl. 427-248.100.
Knapp, Johnn P. Container dumping mechanism. 4,966,514, Cl. 414-408.000.
Knauf, Werner: *See*—
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Laders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.
Knaup, Gerhard: *See*—
Quad, Reiner; Ringelstein, Udo; Plotz, Fred; and Knaup, Gerhard, 4,967,081, Cl. 250-338.100.
Knight, Peter C.: *See*—
Garner-Gray, Peter F.; Knight, Peter C.; and Niven, Ian; E., 4,966,606, Cl. 252-174.140.
Knill, Gary G., to Paris Playground Equipment Inc. Damped rotating platform for parks. 4,966,361, Cl. 272-33.00R.
Kobayashi, Akihiko: *See*—
Hasegawa, Takeshi; and Kobayashi, Akihiko, 4,967,209, Cl. 346-140.00R.
Kobayashi, Koji: *See*—
Yamashita, Yuji; Kobayashi, Koji; Shimizu, Keisuke; and Maekawa, Koji, 4,966,301, Cl. 220-270.000.
Kobayashi, Masao. Apparatus for the formation of a shaped food product. 4,966,542, Cl. 425-307.000.
Kobayashi, Takahiko: *See*—
Naito, Ichiro; Kobayashi, Takahiko; and Maezawa, Hiroyuki, 4,967,348, Cl. 364-200.000.
Kobayashi, Takashi; Suzuki, Eiji; and Uchiyama, Yoshitaka, to Starlite Co., Ltd. Pin-on-disk type wear testing device. 4,966,030, Cl. 73-7.000.
Kobayashi, Takashi: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Kobayashi, Takeo: *See*—
Numako, Norio; and Kobayashi, Takeo, 4,967,218, Cl. 354-195.100.
Kocher & Beck OHG Gravieranstalt und Rotationsstanzenbau: *See*—
Beck, Rolf, 4,966,054, Cl. 76-4.000.
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, to Hitachi, Ltd. Digital signal processor suitable for extacting minimum and maximum values at high speed. 4,967,349, Cl. 364-200.000.
Kodama, Masaroshi: *See*—
Urataki, Etsuo; Kodama, Masaroshi; and Matsuno, Hiromitsu, 4,967,118, Cl. 315-56.000.
Kodama, Tatsuaki; and Takada, Yoshiyuki, to Matsushita Electric Industrial Co., Ltd. Blower. 4,956,524, Cl. 415-223.000.
Koga, Fusamitsu. Apparatus for enhancing engine performance. 4,966,121, Cl. 123-536.000.
Koh, Futoyoshi: *See*—
Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, 4,966,821, Cl. 428-694.000.
Kohatsu, Iwao: *See*—
Khoury, Issam A.; Heistand, Robert H., II; and Kohatsu, Iwao, 4,966,742, Cl. 264-166.000.
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, to Tanabe Seiyaku Co., Ltd. Antibacterial lyophilized preparation of aspoxicillin. 4,966,899, Cl. 514-197.000.
Kohno, Satoshi; and Ara, Hirofumi, to Atsugi Motor Parts Company, Limited. Lock-up torque converter for automatic transmissions. 4,966,261, Cl. 192-3.290.
Koide, Mitsuo: *See*—
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.
Koike, Tadahiro: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.
Koike, Yuzuru: *See*—
Seki, Yasunari; Koike, Yuzuru; Tachibana, Yosuke; and Tsukimura, Kiyoshi, 4,966,110, Cl. 123-327.000.
Koito Manufacturing Co., Ltd.: *See*—
Yamada, Atsushi, 4,965,950, Cl. 40-546.000.
Kojima, Tetsuo: *See*—
Inoue, Noriyuki; Hirano, Shigeo; Kojima, Tetsuo; and Yamamoto, Mitsuru, 4,966,836, Cl. 430-598.000.
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, to Hitachi, Ltd.; and Tokyo Electric Power Company, The. Ceramics-coated heat resisting alloy member. 4,966,820, Cl. 428-622.000.
Kokogawa, Toru: *See*—
Niki, Kenichi; Kokogawa, Toru; and Takasago, Hayato, 4,967,261, Cl. 357-70.000.

Kokuyo Co., Ltd.: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.

Kolmberger, Manfred: *See*—
Rohm, Gunter H.; and Kolmberger, Manfred, 4,966,375, Cl. 279-6.000.

Komiya, Masayoshi: *See*—
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, 4,966,432, Cl. 350-96.150.

Komlos, Karl; and Mihalcea, Radu, to Seeger-Orbis GmbH. Tensioning assembly apparatus having transducers mounted on the projections for tensioned retaining rings. 4,965,926, Cl. 29-705.000.

Komurasaki, Satoshi; and Ueda, Atsushi, to Mitsubishi Denki Kabushiki Kaisha. Acceleration detector. 4,967,114, Cl. 310-329.000.

Kondo, Kenji: *See*—
Inagaski, Hiroyoshi; Fukami, Masataka; and Kondo, Kenji, 4,966,494, Cl. 405-184.000.

Kondo, Shigeo; and Yamamura, Yasuharu, to Matsushita Electric Industrial Co., Ltd. Manufacturing process for chevrel phase compounds. 4,966,749, Cl. 419-10.000.

Konishi, Kunihiko: *See*—
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, 4,966,882, Cl. 502-309.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Ito, Tsukasa; Kawakatsu, Satoshi; Onishi, Akira; and Takekoshi, Masayo, 4,966,856, Cl. 436-170.000.

Konno, Toshihiro: *See*—
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, 4,967,361, Cl. 564-424.050.

Konopka, John G., to Zenith Electronics Corp. Saturable transformer regulator for flyback power supply. 4,967,335, Cl. 363-82.000.

Konose, Yoshiomi: *See*—
Kimura, Masaru; Konose, Yoshiomi; and Nakamura, Yuji, 4,966,175, Cl. 132-112.000.

Kopf, Bruce A.: *See*—
Midlang, Brian M.; Kopf, Bruce A.; and Walker, Richard N., 4,966,004, Cl. 62-77.000.

Kopka, Ihor E.: *See*—
Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., 4,966,907, Cl. 514-337.000.

Koppatsch, Wolfgang, to Wagner, Paul-Heinz. Power wrench. 4,966,057, Cl. 81-469.000.

Korea Research Institute of Chemical Technology: *See*—
Lee, Young K.; Park, Sang-Eon; and Kwon, Young S., 4,966,970, Cl. 544-410.000.

Kornbrekke, Henning N.; and Boiucaner, Leon, to Stanley Works, The. Door sensor system. 4,967,083, Cl. 250-341.000.

Korudanov, Georgi N.: *See*—
Enchev, Ivan D.; Starev, Lyuben R.; Illel, Elieser P.; and Korudanov, Georgi N., 4,966,624, Cl. 75-10.650.

Kosaka, Toshinobu: *See*—
Watanabe, Hitosi; Takagishi, Ikuo; Kosaka, Toshinobu; and Kawabata, Katsuhiko, 4,966,480, Cl. 401-134.000.

Kossiakoff, Nicolas: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,966,783, Cl. 426-565.000.

Kourogi, Isao; and Hirooka, Masami, to Kubota Ltd. Apparatus for controlling posture of front loader. 4,966,518, Cl. 414-700.000.

Kowdley, Balasubramanian S.: *See*—
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.

Koyama, Isamu: *See*—
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.

Koyama, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. In-tank type fuel pump. 4,966,522, Cl. 415-121.200.

Koyama, Masao: *See*—
Watanabe, Kyoichi A.; and Koyama, Masao, 4,966,918, Cl. 514-656.000.

Koyama, Satoshi: *See*—
Maeda, Tadayuki; Koyama, Satoshi; and Okamura, Kazuo, 4,967,025, Cl. 570-177.000.

Kozhushko, Alexandr N.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.

Kraft General Foods, Inc.: *See*—
Benjamin, Earl J.; Ke, Charles H.; Hynson, Richard B.; and Hsu, Chi Ming L., 4,966,778, Cl. 426-19.000.

Krapf, Edward J. Microwave heat pipe heating system. 4,967,052, Cl. 219-10.55R.

Krapp, Michael: *See*—
Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krapp, Michael, 4,967,316, Cl. 361-424.000.

Krase, Horst: *See*—
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,966,945, Cl. 525-113.000.

Kraner, Alwin; and Frueh, Richard P., to Kraner, Alwin. Handlebar-mounted cable control. 4,966,047, Cl. 74-502.200.

Kraus, Jeffrey L.; and Guthrie, Linda T., to Advanced Cardiovascular Systems, Inc. Extendable guidewire for vascular procedures. 4,966,163, Cl. 128-772.000.

Krause, Hans-Peter: *See*—
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.

Krauss-Maffei A.G.: *See*—
Soechtig, Wolfgang, 4,966,466, Cl. 366-132.000.

Kretzmer, Kuniko K.: *See*—
Wun, Tze-Chein; Kretzmer, Kuniko K.; and Broze, George J., Jr., 4,966,852, Cl. 435-235.000.

Krigmont, Henry V.; and Coe, Everett L., Jr., to Wahlco, Inc. Conditioning of gas streams containing particulate. 4,966,610, Cl. 55-5.000.

Krishnakumar, Suppayan M.; Nahill, Thomas E.; and Collette, Wayne N., to Continental PET Technologies, Inc. Apparatus for forming a vented recyclable multilayer barrier container. 4,966,543, Cl. 425-522.000.

Krase, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased (by Schroeder, Carl H., legal representative), to Hoechst Aktiengesellschaft. Fluoro-containing 1-arylalkoxytris(-dialkylamino)phosphonium salt, a process for their preparation and their use. 4,966,987, Cl. 558-115.000.

Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, to Nippon Oil Co., Ltd. Method for hydrocracking heavy fraction oils. 4,966,679, Cl. 208-58.000.

Kubota, Ltd.: *See*—
Aikawa, Norihiro, 4,966,240, Cl. 172-825.000.
Kourogi, Isao; and Hirooka, Masami, 4,966,518, Cl. 414-700.000.

Kudo, Takanori: *See*—
Ishihara, Heigo; Osaki, Akira; and Kudo, Takanori, 4,966,797, Cl. 427-64.000.

Kudo, Yoshinobu: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.

Kue Engineering Limited: *See*—
Kelsall, Thomas W., 4,965,968, Cl. 51-410.000.

Kuka Wehrtechnik GmbH: *See*—
Kaustrater, Gert; Jorg, Josef; and Janda, Helmut, 4,966,064, Cl. 89-46.000.

Kukla, Reiner: *See*—
Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, 4,966,677, Cl. 204-298.210.

Kumagi, Shoji: *See*—
Lane, Leslie A.; Lybeck, Lynn V.; Perloff, David S.; and Kumagi, Shoji, 4,967,381, Cl. 364-551.010.

Kumano, Masafumi: *See*—
Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, 4,966,821, Cl. 428-694.000.

Kumazawa, Hiroshi, to Japan Aviation Electronics Industry, Inc. Apparatus for connecting a connector head having a pair of cover adaptors with a cable. 4,965,923, Cl. 29-566.300.

Kumiko, Mori: *See*—
Setsuko, Takahashi; Kikuko, Akimoto; Kumiko, Mori; and Ryozo, Akama, 4,966,660, Cl. 204-34.000.

Kunkel, Heinrich; and Olschewski, Armin, to SKF GmbH. Drive and bearing for water pump. 4,966,572, Cl. 474-199.000.

Kuno, Toshitaka: *See*—
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.

Kuntz, Richard E.; and Baim, Donald S., to Beth Israel Hospital Association, The. Laser atherectomy catheter. 4,966,596, Cl. 606-7.000.

Kunugiza, Keitaro: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.

Kunz, Walter: *See*—
Eckhardt, Wolfgang; Meyer, Alfred; and Kunz, Walter, 4,966,908, Cl. 514-340.000.

Kuo, Chun-Liang. Mechanically controlled-writing apparatus with presharpened pencil lead elements. 4,966,478, Cl. 401-57.000.

Kuppelmaier, Harald: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomana, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

Kurachi, Kotoku: *See*—
Vallee, Bert L.; and Kurachi, Kotoku, 4,966,849, Cl. 435-199.000.

Kurachi, Takayoshi: *See*—
Sumita, Mutsutaka; and Kurachi, Takayoshi, 4,967,189, Cl. 340-679.000.

Kuragairi, Hiroyasu: *See*—
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.

Kurimoto Ltd.: *See*—
Inagaski, Hiroyoshi; Fukami, Masataka; and Kondo, Kenji, 4,966,494, Cl. 405-184.000.

Kurita, Kazuyuki: *See*—
Mieno, Fumitake; Kurita, Kazuyuki; Nakamura, Shinji; and Shimizu, Atuo, 4,966,861, Cl. 437-99.000.

Kuroki, Yasuhiro: *See*—
Taguchi, Masaru; Kuroki, Yasuhiro; Uchida, Yoshiharu; and Kawano, Saburo, 4,966,540, Cl. 425-208.000.

Kurono, Tatsuo: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; and Kurono, Tatsuo, 4,966,282, Cl. 206-330.000.
Kurtz, Joachim: *See*—
Lehmann, Werner; Fuss, Manfred; and Kurtz, Joachim, 4,966,353, Cl. 270-45.000.
Kutner, Andrzej: *See*—
DeLuca, Hector F.; Kutner, Andrzej; and Schnoes, Heinrich K., 4,966,965, Cl. 536-27.000.
Kutsuna, Schuzou: *See*—
Ibusuki, Takashi; Nakamura, Keigo; and Kutsuna, Schuzou, 4,966,665, Cl. 204-157.300.
Kuwabara, Hiroshi; and Kitazawa, Shooji, to OKI Electric Industry Co., Ltd. Erasable and programmable read-only memory system. 4,967,399, Cl. 365-230.060.
Kuwae, Yoshihiko: *See*—
Ueno, Ryuzo; Masada, Yoshiyasu; Kuwae, Yoshihiko; and Kawata, Keiji, 4,966,992, Cl. 562-424.000.
Kuwata, Chiyuki, to Nikon Corporation. Re-imaging lens for focus state detecting device. 4,967,226, Cl. 354-406.000.
Kuwayama, Hideki: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Kuze, Alexander; and Mitchell, Gil. Squaring tape measure case. 4,965,944, Cl. 33-760.000.
Kuznetsova, Tatyana A.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, to Brother Kogyo Kabushiki Kaisha. Tape printer. 4,966,476, Cl. 400-208.000.
Kwon, Young S.: *See*—
Lee, Young K.; Park, Sang-Eon; and Kwon, Young S., 4,966,970, Cl. 544-410.000.
Kyokujitsu Company, Ltd.: *See*—
Shima, Yoshisuke, 4,966,003, Cl. 62-63.000.
Kyowa Machinery Co., Ltd.: *See*—
Kikuchi, Kouichi, 4,965,981, Cl. 53-142.000.
Labes, Mortimer M.; and Chen, J. H., to Temple University. Transition-metal-carbon composites and methods for making. 4,966,817, Cl. 428-552.000.
Laboratori Guidotti SpA: *See*—
Turbanti, Luigi; and Garzelli, Giorgio, 4,966,993, Cl. 562-540.000.
Laborie, Claude F., to Rollin, S.A. Method for manufacturing an electromagnetic shielding gasket. 4,966,637, Cl. 156-47.000.
Laby, Jordan M.: *See*—
Henkin, Melvyn L.; and Laby, Jordan M., 4,965,893, Cl. 4-542.000.
Lachenberg, James A. Dental flosser. 4,966,176, Cl. 132-325.000.
Ladd, Judith A.; and Ritsko, Joseph E. Method for recovering chromium from chromium-bearing material. 4,966,760, Cl. 423-53.000.
Ladouceur, Henry E.: *See*—
Siegmund, Arthur J.; and Ladouceur, Henry E., 4,966,647, Cl. 156-640.000.
Lagan Plast AB: *See*—
Hjordie, Jorgen, 4,966,302, Cl. 220-306.000.
Lai, Chenmin. Expansible type triangular umbrella ribs and the related collapsing mechanism. 4,966,180, Cl. 135-25.00R.
Lai, Hoi K.; and Davis, Robert A., to Uniroyal Chemical Company, Inc.; and Uniroyal Chemical Ltd./Ltee. Fungicidal oxathiin azoles. 4,966,910, Cl. 514-383.000.
Lair, Jean-Pierre: *See*—
Fage, Etienne; and Lair, Jean-Pierre, 4,966,327, Cl. 239-265.290.
L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Ecalle, Olivier; and Vinckx, Valery, 4,966,632, Cl. 148-16.000.
Lakshmanan, Vaikuntam I.; Melnbardis, Dzinsars; Geisler, Robert A.; and McQueen, Nairn M., to Carbovan Inc. Process for treatment of flyash. 4,966,761, Cl. 423-118.000.
Lamba-Beta-Epsilon Group: *See*—
Kelly, Edward C., 4,966,304, Cl. 221-6.000.
Lambert, Patrick M.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,085, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,087, Cl. 250-483.100.
Lamiflex S.p.A.: *See*—
Carrara, Elio, 4,966,203, Cl. 139-91.000.
Lamson, William C.: *See*—
Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., 4,966,179, Cl. 135-19.500.
Lancaster, Gerald M.: *See*—
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., 4,966,810, Cl. 428-335.000.
Landa, Benzion: *See*—
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, 4,966,824, Cl. 430-115.000.
Landau, Sergio, to Vitajet Industria E. Commercio Ltda. Non reusable disposable capsule containing an individual vaccine dose to be hypodermically injected with a pressure needleless injection apparatus. 4,966,581, Cl. 604-72.000.
Landeck, Harry A., to First Brands Corporation. Apparatus and process for high speed waterjet cutting of extensible sheeting. 4,966,059, Cl. 83-53.000.
Landis, Michael E.; Pelrine, Bruce P.; and Yan, Tsoung Y., to Mobil Oil Corporation. Hydrocracking high viscosity synthetic lubricant. 4,967,030, Cl. 585-241.000.
Lane, Leslie A.; Lybeck, Lynn V.; Perloff, David S.; and Kumagi, Shoji, to Prometrix Corporation. Process control interface system for managing measurement data. 4,967,381, Cl. 364-551.010.
Lane, Michael C.: *See*—
Bell, Howard F.; and Lane, Michael C., 4,967,330, Cl. 362-311.000.
Lang, David J.: *See*—
Ames, John; Lang, David J.; and Welsh, Richard E., 4,966,067, Cl. 92-150.000.
Langen, Michael: *See*—
Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, 4,967,017, Cl. 568-621.000.
Langerbeins, Klaus; and Gruber, Wilhelm, to Rohm GmbH. Method for making heteropolyacid catalysts and catalysts made by the method. 4,966,877, Cl. 302-209.000.
Langley, Lawrence W. Eddy current turbomachinery blade timing system. 4,967,153, Cl. 324-174.000.
Langston, Thomas J. Safety switch for explosive well tools. 4,967,048, Cl. 200-334.000.
Lanzillotti, Harry V.: *See*—
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.
Larrabee, Scott: *See*—
Hughes, Gregory G.; and Larrabee, Scott, 4,966,230, Cl. 165-150.000.
Larrivee, Ronald J.; and Downs, John D. Concrete block wall. 4,965,979, Cl. 52-585.000.
LaSalle, Jerry C.; Batra, Ravi; and Rorabaugh, Donald T., to Allied-Signal Inc. High density-high strength uranium-titanium-tungsten alloys. 4,966,750, Cl. 420-3.000.
Lascon Lighting Industries (Proprietary) Limited: *See*—
Barclay, John A., 4,967,324, Cl. 362-147.000.
Laseneur, Patrick: *See*—
Andrieux, Raymond; Hom, Pierre; and Laseneur, Patrick, 4,967,111, Cl. 310-90.000.
Laska, Herbert, to Maschinenfabrik Laska Gesellschaft m.b.H. Meat chopper. 4,966,332, Cl. 241-199.700.
Lassow, Eliot S.: *See*—
Johnson, Paul R.; and Lassow, Eliot S., 4,966,225, Cl. 164-519.000.
Laughton, William J.: *See*—
Claydon, Glenn S.; and Laughton, William J., 4,967,332, Cl. 363-17.000.
Lavallee, Pierre A.: *See*—
Buchar, Wayne A.; Nau, Keith A.; and Lavallee, Pierre A., 4,967,233, Cl. 355-233.000.
Lavelle, Grant E., to Diversey Corporation. Method and apparatus for de-gelling a liquid mixture. 4,966,182, Cl. 137-1.000.
Le Carbone-Lorraine: *See*—
Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, 4,966,729, Cl. 252-511.000.
Leavens, Weston. Deck bracket. 4,965,980, Cl. 52-712.000.
LeBow, Dwight R. Steel utility structure and method for assembly thereof. 4,965,974, Cl. 52-301.000.
Lebsock, Robert A., to United States of America, Army. Gyro control and monitor circuit. 4,967,123, Cl. 318-490.000.
Lechtken, Peter: *See*—
Hoercher, Ulrich; and Lechtken, Peter, 4,966,734, Cl. 260-420.000.
Leclercq, Jacques: *See*—
Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, 4,966,618, Cl. 65-106.000.
Ledeboer, Adrianus M.: *See*—
Verrips, Cornelis T.; Maat, Jan; Edens, Luppo; and Ledeboer, Adrianus M., 4,966,842, Cl. 435-69.100.
Lee, David L., to ICI Americas Inc. Trisubstituted benzoic acid intermediates. 4,966,998, Cl. 562-869.000.
Lee, Fang-Jen S.: *See*—
Smith, John A.; and Lee, Fang-Jen S., 4,966,848, Cl. 435-193.000.
Lee, King F.; and Martin, Frederick L., to Motorola, Inc. Crystal reference for use in oscillator circuit. 4,967,165, Cl. 331-66.000.
Lee, Lin-nan: *See*—
Kao, Yih-Sien; and Lee, Lin-nan, 4,967,272, Cl. 358-135.000.
Lee, Robert D.; and Mounger, Robert W., to Dallas Semiconductor Corporation. Differential-time-constant bandpass filter using the analog properties of digital circuits. 4,967,108, Cl. 307-520.000.
Lee, Young K.; Park, Sang-Eon; and Kwon, Young S., to Korea Research Institute of Chemical Technology. Process for manufacturing pyrazines. 4,966,970, Cl. 544-410.000.
Lee, Yuan-Ho. Expansion bolt unit for repeated use. 4,966,511, Cl. 411-55.000.
Leeser, Miriam E.: *See*—
Scavezze, Daniel C.; Leeser, Miriam E.; Kammerer, Gerald A.; and Prescott, William R., 4,967,344, Cl. 364-200.000.
Leffler, John T. Prophylactic device and method. 4,966,166, Cl. 128-844.000.
Legendre, Jacques: *See*—
Ariel, Joelle; and Legendre, Jacques, 4,967,172, Cl. 333-161.000.
Lehman, Richard F.: *See*—
Rees, James D.; Lehman, Richard F.; and Ossman, Kenneth R., 4,967,265, Cl. 358-75.000.

Lehmann, Werner; Fuss, Manfred; and Kurtz, Joachim, to Mathias Bauerle GmbH. Chief folding machine with eye adhesive moistener. 4,966,353, Cl. 270-45.000.

Leja, Andrzej: *See*—
Stephen, James C.; Schlosser, Erich H.; and Leja, Andrzej, 4,966,125, Cl. 126-25.00R.

Leland Stanford University, Board of Trustees of: *See*—
Zdeblick, Mark, 4,966,646, Cl. 156-633.000.

Lemco Tool Corporation: *See*—
Miller, Glenn, 4,966,056, Cl. 81-44.000.

Lenker, Don H.: *See*—
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,965,993, Cl. 56-327.100.

Lennox, James J., to Design Specialties Laboratories. Disposable hypodermic syringe with retractable needle. 4,966,593, Cl. 604-198.000.

Lenskold, Richard K.: *See*—
Matlin, Ronald W.; Lenskold, Richard K.; and Rangarajan, Anand, 4,966,631, Cl. 136-244.000.

Lent, Robert S.; Willis, Arthur C.; and Doran, Robert W. Data processing system having plurality of processors and channels controlled by plurality of system control programs through interrupt routing. 4,967,342, Cl. 364-200.000.

Lentine, Anthony L.; and Miller, David A. B., to AT&T Bell Laboratories. Single-ended optical logic arrangement. 4,967,068, Cl. 250-213.00A.

Leone, Salvatore: *See*—
Rodenberg, Orville C.; Mey, William; Paczkowski, Francis M.; and Leone, Salvatore, 4,967,236, Cl. 355-272.000.

Lermer, Helmut: *See*—
Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, 4,967,013, Cl. 568-433.000.

Les Entreprises Bernard Baillargeon Inc.: *See*—
Baillargeon, Bernard, 4,966,242, Cl. 180-9.440.

Lesser, Bertram: *See*—
Schwartz, Larry A.; and Lesser, Bertram, 4,966,414, Cl. 297-445.000.
Schwartz, Larry A.; and Lesser, Bertram, 4,966,415, Cl. 297-445.000.

Lestox, Inc.: *See*—
Mudgett, Donald, 4,966,638, Cl. 156-51.000.

Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, to Saint-Gobain Vitrage. Method and apparatus for bending and tempering glass plates. 4,966,618, Cl. 65-106.000.

Letray, Gerard: *See*—
Delannoy, Francis; and Letray, Gerard, 4,966,657, Cl. 203-76.000.

Leutgob, Manfred: *See*—
Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, 4,966,349, Cl. 266-276.000.

Levanon, Moshe: *See*—
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, 4,966,824, Cl. 430-115.000.

Lever Brothers Company, division of Conopco, Inc.: *See*—
Garner-Gray, Peter F.; Knight, Peter C.; and Niven, Ian; E., 4,966,606, Cl. 252-174.140.

Leverd, Elie; Bauer, Michel; and Basquin, Serge, to Pierre Fabre Medicament. Stable aqueous solution of vincristine sulfate. 4,966,903, Cl. 514-283.000.

Levit, Boris; and Millerick, Michael A. C., to National Semiconductor Corporation. Electrolytic apparatus with unequal legged basket-carrier. 4,966,672, Cl. 204-198.000.

Lewis, Leland M.: *See*—
Webb, Stuart C.; Lewis, Leland M.; and Morris-Thurgood, Jayne A., 4,966,146, Cl. 128-419.0PG.

Lewis, Richard A. J.; and Forbush, Donald C. Sulfur dioxide generator. 4,966,757, Cl. 422-62.000.

Leybold Aktiengesellschaft: *See*—
Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, 4,966,677, Cl. 204-298.210.

LGZ Landis & Gyr Zug, AG: *See*—
Davies, Christopher P., 4,967,145, Cl. 324-127.000.
Seitz, Thomas, 4,967,156, Cl. 324-249.000.

Liberman, Michael; and Kann, Gary. Beach wind-shielding and signalling device. 4,966,181, Cl. 135-87.000.

Libman, Jacqueline: *See*—
Shanzer, Abraham; Libman, Jacqueline; and Lifson, Shneior, 4,966,997, Cl. 562-623.000.

Libove, Joel: *See*—
Gevins, Alan S.; Durousseau, Donald; and Libove, Joel, 4,967,038, Cl. 128-644.000.

Li-Chan, Eunice: *See*—
Durance, Timothy; Li-Chan, Eunice; and Nakai, Shuryo, 4,966,851, Cl. 435-206.000.

Lied, Thomas: *See*—
Giray, Guenes; Huthmacher, Klaus; Kleemann, Axel; and Lied, Thomas, 4,966,732, Cl. 260-399.000.

Lifson, Shneior: *See*—
Shanzer, Abraham; Libman, Jacqueline; and Lifson, Shneior, 4,966,997, Cl. 562-623.000.

Liljenfeldt, Gosta; Rosgren, Carl-Erik; Sjoberg, Harry; and Vestergren, Rolf, to Oy Wartsila AB. Method for testing different substances and a combustion engine for applying the method. 4,967,035, Cl. 73-116.000.

Lilly, A. Clifton, Jr.: *See*—
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.

Lim, Jun Y.; and Na, Jong O. Automatic stepless transmission apparatus and method thereof. 4,966,575, Cl. 475-257.000.

Lin, Jui C. Lock set with spindle lock. 4,966,399, Cl. 292-359.000.

Lin, Long-Cing. Series of peripheral apparatuses for rail type of drafting table. 4,966,289, Cl. 211-69.500.

Lina, Jean-Pierre, to Societe Anonyme dite: VALOIS. Device enabling a spray valve to be used in any position. 4,966,313, Cl. 222-402.190.

Lina, Jean-Pierre; and Di Giovanni, Patrick, to Valois. Non-return valve for admitting a liquid to be sprayed into a pump chamber, and utilization thereof. 4,966,535, Cl. 417-553.000.

Lindberg Corp.: *See*—
Schneider, Harry E., 4,966,348, Cl. 266-79.000.

Linde Aktiengesellschaft: *See*—
Bauer, Heinz, 4,966,612, Cl. 62-24.000.
Rebhan, Dieter, 4,966,493, Cl. 405-128.000.

Linden, Antti; Pennanen, Risto; and Stormbom, Lena, to Oy Nokia AB. Apparatus for cooling an optical fiber. 4,966,615, Cl. 65-12.000.

Link, Larry R. Roller bushing. 4,966,472, Cl. 384-474.000.

Linke, Thomas A.; Livingston, Troy W.; Wanha, Christopher D.; and Shewey, Charles E., to Buehler, Ltd. Mounting press. 4,966,538, Cl. 425-144.000.

Linus Pauling Institute of Science and Medicine: *See*—
Fleming, James E., 4,966,854, Cl. 436-57.000.

Lipton, Lenny; and Ackerman, Marvin, to StereoGraphics. Liquid crystal shutter system for stereoscopic and other applications. 4,967,268, Cl. 358-92.000.

Litton Systems, Inc.: *See*—
Rahn, John P., 4,966,437, Cl. 350-166.000.

Liu, Hsing J.: *See*—
Pang, Peter K. T.; Wang, Lawrence C. H.; Benishin, Christina G.; and Liu, Hsing J., 4,966,893, Cl. 514-54.000.

Livingston, Troy W.: *See*—
Linke, Thomas A.; Livingston, Troy W.; Wanha, Christopher D.; and Shewey, Charles E., 4,966,538, Cl. 425-144.000.

Lo, Josephine N.: *See*—
Chow, Peter P.; Lo, Josephine N.; and Chow, Loren A., 4,966,138, Cl. 128-155.000.

Lo, Young S.; Shamblee, Dwight A.; Causey, David H.; and Mays, Richard P., to A. H. Robins Company, Incorporated. Process for synthesis of azetidine and novel intermediates therefor. 4,966,979, Cl. 548-950.000.

Lockheed Missiles & Space Company, Inc.: *See*—
Robb, Paul N., 4,966,448, Cl. 350-418.000.

Lombardi, Massimo: *See*—
Santandrea, Luciano; and Lombardi, Massimo, 4,965,924, Cl. 29-596.000.

Lomeli, Richard. Footwear dryer adapter for use with hand-held blow dryer. 4,967,060, Cl. 392-384.000.

London, Christopher L., to Watkins-Johnson Company. Apparatus for low stress polishing of spherical objects. 4,965,967, Cl. 51-289.00S.

Lonza Ltd.: *See*—
Duc, Laurent, 4,966,989, Cl. 560-183.000.

Loof, Ingemar, to AC Greiff Ytbehandling AB. Apparatus in a powder sprayer. 4,966,330, Cl. 239-690.000.

Lopez, Rudolph M.; Nix, James L.; and Weinstein, Robert E., to International Business Machines Corporation. Shallow magnetic head shield for reducing feedthrough. 4,967,301, Cl. 360-128.000.

Lopez, Steven R.: *See*—
Corral, Edward D.; and Lopez, Steven R., 4,966,451, Cl. 351-43.000.

Loral Fairchild Corporation: *See*—
Suni, Paul P., 4,967,249, Cl. 357-24.000.

Lord, Stephen M.: *See*—
Schumacher, John C.; McMenamin, Joseph C.; Anderson, Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., 4,966,611, Cl. 55-20.000.

Loreth, Andrzej: *See*—
Torok, Vilmos; and Loreth, Andrzej, 4,967,119, Cl. 315-111.910.

LoRusso, Michael. Non-leaking venturi carburetor. 4,966,735, Cl. 261-40.000.

Loschner, Hans: *See*—
Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., 4,967,088, Cl. 250-491.100.

Losee, D. Bruce, Jr.: *See*—
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.

Losic, Novica A.; and Varga, Ljubomir D. Synthesis of load-independent ac drive systems. 4,967,134, Cl. 318-802.000.

Lu, Keh J. Knife stand. 4,966,339, Cl. 248-37.300.

Lubart, Rachel: *See*—
Rochkind, Simeone; Barr-Nea, Liliane; and Lubart, Rachel, 4,966,144, Cl. 128-395.000.

Lubbe, Carl H.: *See*—
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., 4,966,077, Cl. 102-313.000.

Lucas, Gary M.: *See*—
Gross, David C.; and Lucas, Gary M., 4,966,922, Cl. 522-25.000.

Lucas Industries public limited company: *See*—
Basten, Mark J., 4,966,114, Cl. 123-396.000.
Farr, Glyn P. R., 4,966,248, Cl. 180-197.000.

Lucca, Eusebio; and Rohrer, Paul, to Matec Holding AG. Noise-reducing structural element. 4,966,799, Cl. 428-95.000.

Luchinger, Paul; and Fringeli, Eduard, to Mettler Instrumente AG. Vessel holding device for precision balances and analytical balances. 4,966,241, Cl. 177-253.000.

Luchtenberg, Helmut: *See*—
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, 4,966,772, Cl. 424-482.000.

Ludden, Christopher A.: *See*—
D'Ambrosia, George C.; and Ludden, Christopher A., 4,967,183, Cl. 340-552.000.

Luders, Walter: *See*—
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.

Ludmirsky, Ariold; and Zigler, Arie. Method and apparatus for fatigue detection. 4,967,186, Cl. 340-575.000.

Ludwig, Thomas; Schettler, Helmut; Wagner, Otto M.; and Zuhlke, Rainer, to International Business Machines Corporation. Circuit for increasing the output impedance of an amplifier. 4,967,104, Cl. 307-443.000.

Lueker, Jonathan C.: *See*—
Berg, William E.; and Lueker, Jonathan C., 4,967,175, Cl. 336-65.000.

Lumma, William C., Jr.; and Phillips, Gary B., to Berlex Laboratories, Inc. 3,4,5,6-tetrahydro-2H-1,7,4-benzodioxazonines as cardiovascular agents. 4,966,967, Cl. 540-568.000.

Lund, Allan W., to Lund Industries, Inc. Windshield visor for trucks having cab roof lights. 4,966,404, Cl. 296-95.100.

Lund Industries, Inc.: *See*—
Lund, Allan W., 4,966,404, Cl. 296-95.100.

Lund, Mark A.; and Garrabrant, Genevieve, to Tilt Limitation Control. Anti-roll system with tilt limitation. 4,966,390, Cl. 280-772.000.

Lupan, Vitaly V.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.

Lusch, Robert F.; and Dulzo, Jeffrey J., to International Business Machines Corp. LRU error detection using the collection of read and written LRU bits. 4,967,414, Cl. 371-51.100.

Lusignea, Richard W.; Stevenson, William S.; and McCoy, John F., III, to Foster Miller, Inc. Film-based structural components with controlled coefficient of thermal expansion. 4,966,806, Cl. 428-220.000.

Lusignea, Richard W.: *See*—
Harvey, Andrew C.; Lusignea, Richard W.; and Racich, James L., 4,966,807, Cl. 428-220.000.

Lusk, Russell F. Removable wind deflector for freight container, and assembly. 4,966,407, Cl. 296-180.100.

Lutz, Lewin R., III: *See*—
Olson, Robert A.; and Lutz, Lewin R., III, 4,966,651, Cl. 162-28.000.

Lybeck, Lynn V.: *See*—
Lane, Leslie A.; Lybeck, Lynn V.; Perloff, David S.; and Kumagi, Shoji, 4,967,381, Cl. 364-551.010.

Lynk, Charles N.; and Heck, Joseph P., to Motorola, Inc. Continuous transmission mode radio with control information monitoring capability. 4,967,407, Cl. 370-50.000.

Lyon, Thomas C.: *See*—
Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., 4,967,271, Cl. 358-105.000.

Lyon, William, to Plant-Tech Horticultural Products, Inc. Platform and watering system for plants. 4,965,963, Cl. 47-81.000.

Lysenkov, Viktor I.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.

Maat, Jan: *See*—
Verrips, Cornelis T.; Maat, Jan; Edens, Luppo; and Ledeboer, Adrianus M., 4,966,842, Cl. 435-69.100.

MacCoss, Malcolm: *See*—
Tolman, Richard L.; and MacCoss, Malcolm, 4,966,895, Cl. 514-81.000.

MacDougal, John G.: *See*—
Dumas, Jerome E.; Harris, Eric W., Jr.; and MacDougal, John G., 4,967,187, Cl. 340-628.000.

Mack, Anthony C.; and Robbins, Robin M., to Fabri-Kal Corporation. Tamper-evident closure for wide mouth container. 4,966,294, Cl. 220-266.000.

Mackel, Wilfried: *See*—
Schulz, Dieter; Wrede, Ulrich; and Mackel, Wilfried, 4,966,576, Cl. 494-56.000.

Mackert, Nikolaus D.: *See*—
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittenbring, Gerhard, 4,966,269, Cl. 192-70.160.

Maddali, Vijay K.: *See*—
Rozman, Gregory I.; and Maddali, Vijay K., 4,967,132, Cl. 318-798.000.

Maeda, Akira; Yoshimura, Masahiko; and Hashimoto, Satoru, to Director General of Agency of Industrial Science and Technology. Pipelined vector processor for executing recursive instructions. 4,967,350, Cl. 364-200.000.

Maeda Industries, Ltd.: *See*—
Tagawa, Koichi, 4,966,046, Cl. 74-502.200.

Maeda, Kazuhiko; and Shimoyashiro, Sadao, to Hitachi, Ltd. Simulation method for modifiable simulation model. 4,967,386, Cl. 364-578.000.

Maeda, Sadahiko; Idei, Yasumasa; and Matsurra, Shinji, to Ube Industries, Ltd. Fluidized bed apparatus. 4,966,101, Cl. 122-4.00D.

Maeda, Tadayuki; Koyama, Satoshi; and Okamura, Kazuo, to Daikin Industries, Ltd. Purification method of carbon fluorides. 4,967,025, Cl. 570-177.000.

Maeda, Yorishige: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, to Matsushita Electric Industrial Co., Ltd. High-frequency heating apparatus having start control device for magnetron power supply circuit. 4,967,051, Cl. 219-10.55B.

Maekawa, Koji: *See*—
Yamashita, Yuji; Kobayashi, Koji; Shimizu, Keisuke; and Maekawa, Koji, 4,966,301, Cl. 220-270.000.

Maezawa, Hiroyuki: *See*—
Naito, Ichiro; Kobayashi, Takahiko; and Maezawa, Hiroyuki, 4,967,348, Cl. 364-200.000.

Maganias, Nicholas H. Allergy test strip. 4,966,159, Cl. 128-743.000.

Magin, Berthold, to MTM Obermaier GmbH. Process and apparatus for treatment of textile fabrics. 4,965,918, Cl. 26-18.500.

Magna International Inc.: *See*—
Harney, William J. J., 4,966,045, Cl. 74-424.80A.

Magnuson, Vernon P., to Micropolis Corporation. Environmentally controlled media defect detection system for Winchester disk drives. 4,967,155, Cl. 324-212.000.

Magouyrk, David W.: *See*—
Fry, Slaton E.; Magouyrk, David W.; Blankenship, Allen J.; Greene, Paul J.; and Johnson, Larry K., 4,966,947, Cl. 525-327.600.

Magyari, Eugen, to Hilti Aktiengesellschaft. Hollow drilling tool. 4,966,502, Cl. 408-59.000.

Mahaim, Cyril, to Firmenich S.A. Process for the preparation of polyunsaturated cyclic compounds. 4,967,033, Cl. 585-358.000.

Mahler, Theodor W., to Texas Instruments Incorporated. BiCMOS power up 3-state circuit having no through current in the disabled mode. 4,967,102, Cl. 307-270.000.

Mahlkow, Hartmut: *See*—
Ehrich, Hans-Jurgen; and Mahlkow, Hartmut, 4,966,786, Cl. 427-97.000.

Mai, Khuong H. X.: *See*—
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,966,914, Cl. 514-461.000.

Maidannik, Vladimir Y.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.

Maier, Manfred; Mielke, Manfred; and Hauser, Peter, to BASF Aktiengesellschaft. Stirred ball mill for grinding pigments. 4,966,331, Cl. 241-172.000.

Maire, Jacques: *See*—
Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, 4,966,729, Cl. 252-511.000.

Maisti, Asko: *See*—
Karna, Toivo; Nieminen, Jukka-Pekka; Maisti, Asko; and Kahonen, Hannu, 4,966,346, Cl. 248-503.000.

Maix, Anton. Convertible textile fire block material. 4,966,800, Cl. 428-97.000.

Makeevsky Inzhenrno-Stroitelny Institut: *See*—
Slez, Leonid G.; and Tjurin, Jury I., 4,966,326, Cl. 239-99.000.

Maki, Hiroshi; and Sasaki, Shigeru, to Sumitomo Chemical Company, Limited. Process for producing N,N-diethylaminophenols. 4,967,004, Cl. 564-397.000.

Malavasi, Enzo. Wearable device for the support of a portable telecamera. 4,967,282, Cl. 358-229.000.

Malchesky, Paul S.: *See*—
Nose, Yukihiko; Malchesky, Paul S.; and Horiuchi, Takashi, 4,966,709, Cl. 210-651.000.

Malmberg, Quentin C.: *See*—
Cowell, Wiley M.; Malmberg, Quentin C.; and Edgar, Jon M., 4,966,005, Cl. 62-79.000.

Mamuzic, Rastko I.: *See*—
Favstritsky, Nicolai A.; and Mamuzic, Rastko I., 4,966,946, Cl. 525-314.000.

MAN Roland Druckmaschinen AG: *See*—
John, Thomas, 4,966,076, Cl. 101-216.000.

Manabe, Yoshiharu; Tomita, Junko; and Shinozaki, Atsushi, to Ricoh Company, Ltd. Image recorder. 4,967,212, Cl. 346-160.000.

Manes, Michael R., to Abbott Laboratories. Self-balancing reflectometer. 4,967,159, Cl. 324-650.000.

Mannesmann Aktiengaesellschaft: *See*—
Stinnertz, Horst, 4,966,022, Cl. 72-41.000.

Mannesmann Rexroth GmbH: *See*—
Kauss, Wolfgang; Muncke, Ludwig; Radtke, Dietrich; and Wittich, Kurt, 4,966,066, Cl. 91-516.000.

Mantus, Ellen K.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.

Mapes, Charles W.; and Snyder, Richard H., to Brunswick Corporation. Outboard motor retainer. 4,966,347, Cl. 248-643.000.

Marabini, Simone: *See*—
Cerinic, Marco M.; and Marabini, Simone, 4,966,889, Cl. 514-11.000.

Marantette, William F., to Optima Industries, Inc. Dynamic tube runout measuring method and apparatus with square wave energized reluctance measuring coils. 4,967,154, Cl. 324-207.120.

Marcadet Mobilier: *See*—
Sonolet, Henri C., 4,966,219, Cl. 160-201.000.

Marcellus, Emerson C., to Schlumberger Technology Corporation. Crystal oscillator and method for mounting the same. 4,967,166, Cl. 331-116.00R.

Marelli Autronica S.p.A.: *See*—
Delf'Acqua, Roberto, 4,966,039, Cl. 73-727.000.

Margrave, Geoffrey E.: *See*—
Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., 4,967,368, Cl. 364-513.000.

Marie, Bruno A. E.: *See*—
Teissier, Etienne M.; and Marie, Bruno A. E., 4,966,080, Cl. 104-289.000.

Marino, Michael, to West Penn Plastics, Inc. Cap and neck finish for a wide mouth container. 4,966,292, Cl. 215-256.000.

Marler, David O.; Sorensen, Charles M.; and Varghese, Philip, to Mobil Oil Corporation. Process for the hydration olefins. 4,967,020, Cl. 568-896.000.

Marlowe, Carolyn: *See*—
Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, 4,966,169, Cl. 131-31.000.

Marnocha, Todd S.: *See*—
Thompson, Bjorn J.; Hustad, Gerald O.; and Marnocha, Todd S., 4,966,470, Cl. 383-61.000.

Marshall, Loren M.; and Wolfe, William A., to Ohio Bell Telephone Company, The. Single slot repeater mounting. 4,966,562, Cl. 439-718.000.

Martin, Frederick L.: *See*—
Lee, King F.; and Martin, Frederick L., 4,967,165, Cl. 331-66.000.

Martinez, George, Jr. Method and apparatus for saving energy in direct fired boilers. 4,966,127, Cl. 126-362.000.

Maruyama, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Telephoto lens system. 4,966,449, Cl. 0350-454.000.

Marzouk, Fred, to Calcomp Inc. Coaxial connector plug using a center conductor sleeve and single point crimping. 4,966,560, Cl. 439-585.000.

Masada, Yoshiyasu: *See*—
Ueno, Ryuzo; Masada, Yoshiyasu; Kuwae, Yoshihiko; and Kawata, Keiji, 4,966,992, Cl. 562-424.000.

Masamoto, Junzo; Ohtake, Junzo; and Kawamura, Mamoru, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for producing formaldehyde and derivatives thereof. 4,967,014, Cl. 568-458.000.

Maschinenfabrik Laska Gesellschaft m.b.H.: *See*—
Laska, Herbert, 4,966,332, Cl. 241-199.700.

Masco Building Products Corp.: *See*—
Boag, Nigel, 4,966,021, Cl. 70-383.000.

Masco Corporation of Indiana: *See*—
Knapp, Alfons; and Buzzi, Gunter, 4,966,789, Cl. 427-248.100.

Mashiko, Yasuhiro: *See*—
Okutsu, Mitsuhiko; Kariya, Tadaaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, 4,967,100, Cl. 307-270.000.

Masqueller, Michael P.; and Okada, David N., to Motorola, Inc. Method of fabricating a lateral semiconductor structure including field plates for self-alignment. 4,966,858, Cl. 437-27.000.

Master Pneumatic-Detroit, Inc.: *See*—
Williamson, Felton, Jr., 4,966,183, Cl. 137-116.500.

Masubuchi, Norio; and Akiyama, Heiemon, to Tokyo Automatic Machinery Works, Ltd. Bag making, filling, and packaging method and apparatus. 4,965,985, Cl. 53-479.000.

Masuda, Bunpei: *See*—
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, 4,966,025, Cl. 72-184.000.

Masuda, Shunichi, to Canon Kabushiki Kaisha. Control system using computers and having an initialization function. 4,967,377, Cl. 364-518.000.

Masuda, Tomohiko: *See*—
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.

Masuda, Yutaka, to Yamana Hatsudoki Kabushiki Kaisha. Automatic speed control system for motorcycles. 4,966,247, Cl. 180-171.000.

Matec Holding AG: *See*—
Lucca, Eusebio; and Rohrer, Paul, 4,966,799, Cl. 428-95.000.

Mathias Bauerle GmbH: *See*—
Lehmann, Werner; Fuss, Manfred; and Kurtz, Joachim, 4,966,353, Cl. 270-45.000.

Matier, William L.: *See*—
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,966,914, Cl. 514-461.000.

Matlin, Ronald W.; Lenskold, Richard K.; and Rangarajan, Anand, to Chronar Corp. Support for photovoltaic arrays. 4,966,631, Cl. 136-244.000.

Matoushek, Robert J., to Eastman Kodak Company. Fusing apparatus for thermal transfer prints. 4,966,464, Cl. 346-76.0PH.

Matsubara, Akinori: *See*—
Shiraki, Kazuyoshi; Ishiguro, Shiro; and Matsubara, Akinori, 4,966,052, Cl. 84-715.000.

Matsubara, Ken: *See*—
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.

Matsuda, Shoichi; Suzuki, Akira; and Kaise, Tatsuo, to Kirin Beer Kabushiki Kaisha. Cell culturing apparatus. 4,966,853, Cl. 435-284.000.

Matsuda, Toshiaki: *See*—
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, 4,966,882, Cl. 502-309.000.

Matsumoto, Shunichi: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.

Matsumoto, Takahiro: *See*—
Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.

Matsumoto, Takao: *See*—
Nakatsukasa, Keiichiroh; and Matsumoto, Takao, 4,966,194, Cl. 137-625.430.

Matsumoto, Tsuruyoshi; Yamamoto, Takashi; Sugimori, Teruhiko; and Shimada, Katsuhiko, to Mitsubishi Rayon Company, Ltd. Plastic optical fiber. 4,966,435, Cl. 350-96.340.

Matsumoto, Yoji: *See*—
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.

Matsumoto, Yutaka: *See*—
Sasaki, Masatomi; Morita, Hirotomo; and Matsumoto, Yutaka, 4,966,699, Cl. 210-321.800.

Matsumura, Yasuo: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Iwamoto, Kouichi, 4,967,009, Cl. 568-309.000.

Matsuno, Hiromitsu: *See*—
Urataki, Etsuo; Kodama, Masaroshi; and Matsuno, Hiromitsu, 4,967,118, Cl. 315-56.000.

Matsurra, Shinji: *See*—
Maeda, Sadahiko; Idei, Yasumasa; and Matsurra, Shinji, 4,966,101, Cl. 122-4.00D.

Matsushima, Hitoshi: *See*—
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, 4,967,349, Cl. 364-200.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hasegawa, Hiroshi, 4,967,133, Cl. 318-798.000.
Kiyohara, Tokuzo; and Deguchi, Masashi, 4,967,338, Cl. 364-200.000.
Kodama, Tatsuaki; and Takada, Yoshiyuki, 4,966,524, Cl. 415-223.000.
Kondo, Shigeo; and Yamamura, Yasuharu, 4,966,749, Cl. 419-10.000.
Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 4,966,153, Cl. 128-661.090.

Matsuura, Hideki, to NEC Corporation. Master-slice type integrated circuit including macrocells associated with delay circuit. 4,967,110, Cl. 307-592.000.

Matsuura, Hitoshi: *See*—
Yamazaki, Etuo; and Matsuura, Hitoshi, 4,967,364, Cl. 364-474.030.

Matsuura, Nobuhiro: *See*—
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, 4,966,712, Cl. 210-705.000.

Matsuzaki, Hitomi: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.

Matsuzaki, Kimishige: *See*—
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.

Matsuzawa, Junichi: *See*—
Nakamura, Akira; and Matsuzawa, Junichi, 4,966,568, Cl. 446-221.000.

Matthews, Robert: *See*—
Davis, Cecil J.; Matthews, Robert; and Bowling, Robert A., 4,966,519, Cl. 414-786.000.

Matushita, Tetunori; Yagihara, Morio; and Sakanoue, Kei, to Fuji Photo Film Co., Ltd. Method for processing a silver halide color photographic material. 4,966,835, Cl. 430-393.000.

Mauger, Philip E., to Nanostructures, Inc. Method for forming a silicon membrane with controlled stress. 4,966,663, Cl. 204-129.300.

Mauro, Edward. Combination golf ball and club head cleaner. 4,965,906, Cl. 15-104.920.

May, Elaine L.: *See*—
Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., 4,967,412, Cl. 371-20.100.

May, Michael D., to Inmos Limited. Microcomputer building block. 4,967,326, Cl. 364-220.000.

Mayer, Udo: *See*—
Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, 4,966,983, Cl. 549-389.000.

Mayerhofer, Franz: *See—*
Droegemueller, Karsten; Mayerhofer, Franz; Klement, Ekkehard; and Deserno, Ulrich, 4,966,444, Cl. 350-376.000.
Mayhew, Christopher A.; and Pritchard, Eric K., to Mayhew, Christopher A. Apparatus for obtaining images for use in displaying a three-dimensional. 4,966,436, Cl. 350-143.000.
Mayhew, Roger D., to Weasler Engineering, Inc. Ball retainer. 4,966,488, Cl. 403-135.000.
Maynard, Jean-Pierre: *See—*
Callier, Bernard; and Maynard, Jean-Pierre, 4,967,333, Cl. 363-17.000.
Mayo, Mark D.: *See—*
Barish, Arnold E.; Kiesling, David A.; Mayo, Mark D.; and Svarczkopf, Walter A., 4,967,151, Cl. 324-158.00T.
Mays, Richard P.: *See—*
Lo, Young S.; Shamblee, Dwight A.; Causey, David H.; and Mays, Richard P., 4,966,979, Cl. 548-950.000.
Mazda Motor Corporation: *See—*
Takasuga, Shunzo; Sugimoto, Yukihiro; Noguchi, Keiichiro; and Urabe, Motohmi, 4,966,221, Cl. 164-120.000.
Mazzoli, Rodney E. Sock joining method. 4,965,902, Cl. 8-150.000.
McAnalley, Bill H., to Carrington Laborstories, Inc. Processes for preparation of aloe products products produced thereby and compositions thereof. 4,966,892, Cl. 514-54.000.
McAuliffe, Robert E.: *See—*
Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., 4,967,412, Cl. 371-20.100.
McCabe, Ralph P., to Colt Industries Inc. Transmission pressure regulator. 4,966,195, Cl. 137-625.610.
McCarthy, Cornelius: *See—*
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,966,458, Cl. 356-328.000.
McClintic, Robert P.: *See—*
Kim, Tai K.; and McClintic, Robert P., 4,966,710, Cl. 210-665.000.
McConway & Torley Corporation: *See—*
Glover, Mary A., 4,966,291, Cl. 213-71.000.
McCord Winn Textron: *See—*
Bishai, Macram N., 4,966,410, Cl. 297-284.000.
McCormick, Francis P.; Innis, Michael A.; and Ringold, Gordon M., to Cetus Corporation. Expression of interferon genes in Chinese hamster ovary cells. 4,966,843, Cl. 435-69.510.
McCoy, John F., III: *See—*
Lusignea, Richard W.; Stevenson, William S.; and McCoy, John F., III, 4,966,806, Cl. 428-220.000.
McCullough, Timothy J.; and Grasselli, Giorgio. Safety control for power operated equipment. 4,965,909, Cl. 17-21.000.
McCusker, Redmond; Heibel, Helmut; and Gilles, Leo, to 501 Lucas Industries Public Ltd. Company. Hydraulic pump and motor assemblies for vehicle hydraulic systems. 4,966,530, Cl. 417-273.000.
McDaniel, Max P.: *See—*
Benham, Elizabeth; McDaniel, Max P.; and Bailey, Fay W., 4,966,951, Cl. 526-106.000.
McDonough, James B. Syphonic flush toilet. 4,965,892, Cl. 4-368.000.
McGill, Charles K.: *See—*
Goe, Gerald L.; McGill, Charles K.; and Sherman, Angela R., 4,966,972, Cl. 546-260.000.
McGregor, Charles W.; and Connell, James J. Ultra-high solids theic polyester enamels. 4,966,932, Cl. 524-245.000.
McKee, Thomas S.: *See—*
Betterton, Joseph T.; McKee, Thomas S.; and Glover, Alfred H., 4,967,047, Cl. 200-83.00J.
McKinney, Richard H. Remote controlled turkey decoy. 4,965,953, Cl. 43-2.000.
McKinnon, Robert M. Flexible pipe saddle. 4,966,397, Cl. 285-197.000.
McMann, Ronald E.: *See—*
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey F., 4,966,865, Cl. 437-192.000.
McMenamin, Joseph C.: *See—*
Schumacher, John C.; McMenamin, Joseph C.; Anderson, Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., 4,966,611, Cl. 55-20.000.
McMichael, John, to Molecular Rx, Inc. Immunotherapeutic methods and compositions employing antigens characteristic of malignant neoplasms. 4,966,753, Cl. 424-88.000.
McNeil (Ohio) Corporation: *See—*
Yuhasz, Frank U., 4,967,303, Cl. 361-23.000.
McNeilab, Inc.: *See—*
Berta, Norbert L, 4,966,771, Cl. 424-478.000.
McQueen, Nairn M.: *See—*
Lakshmanan, Vaikuntam I.; Melnbardis, Dzinsars; Geisler, Robert A.; and McQueen, Nairn M., 4,966,761, Cl. 423-118.000.
Meacham, G. B. Kirby, to nuArc Company, Inc. Registration system for light exposure apparatus. 4,967,230, Cl. 355-91.000.
Measurement Technology Limited: *See—*
Hutcheon, Ian C.; and Epton, David J., 4,967,302, Cl. 361-1.000.
Meat Industry Research Institute of New Zealand, The: *See—*
Fernando, Tissa; and Dunn, Steven E., 4,966,733, Cl. 260-412.600.
Mebata, Akira: *See—*
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Mecanismos Auxiliares Industriales, S.A.: *See—*
Aligue, , 4,965,929, Cl. 29-742.000.
Verge, Ramon M. V., 4,965,928, Cl. 29-742.000.
Medical Action Industries, Inc.: *See—*
Meringola, Joseph, 4,966,595, Cl. 604-393.000.
Medovar, Boris I.: *See—*
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.
Meffert, Alfred: *See—*
Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, 4,967,017, Cl. 568-621.000.
Mehl, Bryon R. Hybrid power system. 4,967,097, Cl. 307-84.000.
Mehra, Madhay; and Weiss, Armin K., to Eastman Kodak Company. Lens arrays for light sensitive devices. 4,966,831, Cl. 430-321.000.
Meinershagen, Charles I. Surgical wire guide. 4,966,143, Cl. 606-103.000.
Melinyshyn, Lev: *See—*
Jaron, Michael; and Melinyshyn, Lev, 4,966,197, Cl. 137-846.000.
Melnbardis, Dzinsars: *See—*
Lakshmanan, Vaikuntam I.; Melnbardis, Dzinsars; Geisler, Robert A.; and McQueen, Nairn M., 4,966,761, Cl. 423-118.000.
Memed, Bozo: *See—*
Pusic, Pavo; and Memed, Bozo, 4,966,109, Cl. 123-197.0AB.
Memoli, Kevin A.: *See—*
Felman, Steven W.; Jirkovsky, Ivo L.; and Memoli, Kevin A., 4,966,905, Cl. 514-314.000.
Mengel, Craig. Method of and structure for the joining of substantially rigid parts together. 4,966,421, Cl. 312-195.000.
Menicon Co., Ltd.: *See—*
Tanaka, Toyoyasu; Yamamoto, Yasuyoshi; and Kaga, Yuzou, 4,965,904, Cl. 15-97.100.
Mercado-Torres, Roberto, to Commonwealth of Puerto Rico. Matching word game employing cubes. 4,966,366, Cl. 273-1.00R.
Mercat, Jean-Pierre, to STE Look rue de la Pigue. Driving wheel for a bicycle or the like, including a sensor for measuring the transmitted torque, and a bicycle equipped with such a wheel. 4,966,380, Cl. 280-259.000.
Merck & Co., Inc.: *See—*
Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., 4,966,907, Cl. 514-337.000.
Tolman, Richard L.; and MacCoss, Malcolm, 4,966,895, Cl. 514-81.000.
Meringola, Joseph, to Medical Action Industries, Inc. Surgical sponge assembly. 4,966,595, Cl. 604-393.000.
Merrell Dow Pharmaceuticals: *See—*
Kane, John M.; and Miller, Francis P., 4,966,909, Cl. 514-359.000.
Merrell Dow Pharmaceuticals Inc.: *See—*
Angelastro, Michael R.; and Blohm, Thomas R., 4,966,897, Cl. 514-177.000.
Angelastro, Michael R.; and Blohm, Thomas R., 4,966,898, Cl. 514-182.000.
Merz, Herbert, to MTU Motoren-und Turbinen-Union Muenchen GmbH. Composite blade construction for a propeller or rotor blade. 4,966,527, Cl. 416-241.00R.
Merz, Theodore P.: *See—*
Hargraves, Peter J.; Dirksing, Robert S.; and Merz, Theodore P., 4,966,780, Cl. 426-118.000.
Metacon AG: *See—*
Tinnes, Bernhard; and Vetterli, Walter, 4,966,315, Cl. 222-600.000.
Mettler Electronics Corp.: *See—*
Houghton, Richard B.; and Obray, Dean C., 4,966,131, Cl. 128-24.00A.
Mettler Instrumente AG: *See—*
Luchinger, Paul; and Fringeli, Eduard, 4,966,241, Cl. 177-253.000.
Mey, William: *See—*
Rodenberg, Orville C.; Mey, William; Paczkowski, Francis M.; and Leone, Salvatore, 4,967,236, Cl. 355-272.000.
Meyer, Alfred: *See—*
Eckhardt, Wolfgang; Meyer, Alfred; and Kunz, Walter, 4,966,908, Cl. 514-340.000.
Meyer, Ernst-August, to WABCO Westinghouse Steuerungstechnik GmbH & Co. Balanced servo-operated multiway valve. 4,966,196, Cl. 137-625.640.
Meyer, Max F., Jr.: *See—*
Cox, Abraham J.; and Meyer, Max F., Jr., 4,966,959, Cl. 528-272.000.
Meyers, Cal Y.; and Chan-Yu-King, Roch, to Southern Illinois University Foundation. Process for preparation of deuterated methylene chloride. 4,967,021, Cl. 570-101.000.
Meyn, Cornelis, to Meyn Machinefabriek B.V. Method and apparatus for separating the heart and the lungs of a heart-lungs package of poultry. 4,965,908, Cl. 17-11.000.
Meyn Machinefabriek B.V.: *See—*
Meyn, Cornelis, 4,965,908, Cl. 17-11.000.
Micheli, Adolph L.; and Dungan, Dennis F., to General Motors Corp. Wear-resistant ceramic for casting rare earth alloys. 4,966,875, Cl. 501-152.000.
Michelucci, John J.; Sherman, Deborah M.; and DeNeale, Richard J., to American Home Products Corporation. Sustained release etodolac. 4,966,768, Cl. 424-468.000.
Micron Technology, Inc.: *See—*
Farnsworth, Warren M., 4,967,262, Cl. 357-80.000.
Micropolis Corporation: *See—*
Magnuson, Vernon P., 4,967,155, Cl. 324-212.000.

Microsoft Corporation: *See*—
Rupel, Wesley O.; and Pisculli, Anthony C., 4,967,378, Cl. 364-518.000.
Midlang, Brian M.; Kopf, Bruce A.; and Walker, Richard N., to Amana Refrigeration, Inc. Electronic control mounting apparatus for refrigerator. 4,966,004, Cl. 62-77.000.
Mieczkowski, Walter L. Transmission safety locking lever apparatus. 4,966,262, Cl. 192-4.00A.
Mielke, Manfred: *See*—
Maier, Manfred; Mielke, Manfred; and Hauser, Peter, 4,966,331, Cl. 241-172.000.
Mieno, Fumitake; Kurita, Kazuyuki; Nakamura, Shinji; and Shimizu, Atuo, to Fujitsu Limited. Vapor deposition method for simultaneously growing an epitaxial silicon layer and a polycrystalline silicone layer over a selectively oxidized silicon substrate. 4,966,861, Cl. 437-99.000.
Mihalcea, Radu: *See*—
Komlos, Karl; and Mihalcea, Radu, 4,965,926, Cl. 29-705.000.
Mihara, Takeshi, to Ube Industries Ltd. Method and apparatus for forming disk wheel like formed parts. 4,966,223, Cl. 164-305.000.
Mikami, Akiyoshi: *See*—
Tanaka, Koichi; Mikami, Akiyoshi; and Taniguchi, Kouji, 4,967,251, Cl. 357-30.000.
Mikata, Yuuichi; and Samata, Shuichi, to Kabushiki Kaisha Toshiba. Method for manufacturing semiconductor device having gate electrodes of different conductivity types. 4,966,866, Cl. 437-193.000.
Mikolajczak, Kenneth L.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.
Miles, Barry J.: *See*—
Featon, Robert J.; Fowler, James W.; and Miles, Barry J., 4,966,392, Cl. 280-801.000.
Millar, Huntly D., to Millar Instruments, Inc. Assembly for positioning diagnostic devices in a biological vessel. 4,966,148, Cl. 128-637.000.
Millar Instruments, Inc.: *See*—
Millar, Huntly D., 4,966,148, Cl. 128-637.000.
Miller, David A. B.: *See*—
Lentine, Anthony L.; and Miller, David A. B., 4,967,068, Cl. 250-213.00A.
Miller, Francis P.: *See*—
Kane, John M.; and Miller, Francis P., 4,966,909, Cl. 514-359.000.
Miller, Gary L.; and Plummer, Robert G. Safety plug for the firing chamber of a weapon. 4,965,952, Cl. 42-70.010.
Miller, Glenn, to Lemco Tool Corporation. Hand-held staple holder. 4,966,056, Cl. 81-44.000.
Miller, Harold M.: *See*—
Baldwin, Blair F.; Baldwin, W. Barton; Lamson, William C.; Miller, Harold M.; and Grenga, John J., 4,966,179, Cl. 135-19.500.
Miller, Jorge P.; and Kling, Miguel F., to Energia Andina Ltd. Process for the alkylation of alkanes or aromatic hydrocarbons. 4,967,034, Cl. 585-446.000.
Miller, Michael K.; and Stockton, Warren D. Large capacity ammunition magazine. 4,965,951, Cl. 42-49.010.
Miller, Robert O.: *See*—
Morgan, Peter J.; and Miller, Robert O., 4,967,146, Cl. 324-158.00R.
Miller, Steven A.: *See*—
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.
Miller, William C.: *See*—
Sit, James K.; and Miller, William C., 4,966,582, Cl. 604-86.000.
Millerick, Michael A. C.: *See*—
Levit, Boris; and Millerick, Michael A. C., 4,966,672, Cl. 204-198.000.
Millipore Corporation: *See*—
Rising, Donald B.; and Zimmerman, Rita, 4,966,667, Cl. 204-182.100.
Milton Roy Company: *See*—
Burns, Richard; Defendorf, James; King, Edward; and McCarthy, Cornelius, 4,966,458, Cl. 356-328.000.
Mimura, Munehiko; Tatumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, to Mitsubishi Denki Kabushiki Kaisha. Constant speed holding apparatus. 4,967,357, Cl. 364-426.040.
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, to Kabushiki Kaisha Toshiba. Semiconductor memory device having a test cell array. 4,967,394, Cl. 365-201.000.
Minami, Shuji: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.
Mine, Atsushi: *See*—
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, 4,967,361, Cl. 564-424.050.
Minematsu, Yoshihiro: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.
MiniScribe Corporation: *See*—
Touchton, James J.; and Baumann, Todd D., 4,967,291, Cl. 360-78.040.
Ministry of International Trade & Industry: *See*—
Kikumoto, Makoto; Moroto, Masakazu; and Osumi, Masato, 4,966,145, Cl. 128-377.000.
Minnesota Mining and Manufacturing Company: *See*—
Hampl, Edward F., Jr.; and Iqbal, Mohammad, 4,967,306, Cl. 361-323.000.
Montean, Samuel, 4,967,185, Cl. 340-572.000.
Randklev, Ronald M., 4,966,465, Cl. 366-111.000.
Minolta Camera Kabushiki Kaisha: *See*—
Hamada, Masataka; and Ishida, Tokuji, 4,967,224, Cl. 354-402.000.
Ishii, Kenjiro; Fukumoto, Fumio; Nagata, Koichi; and Shibata, Akira, 4,967,228, Cl. 355-40.000.
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.
Nakatani, Keiji, 4,967,287, Cl. 358-401.000.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.
Mirzakanien, Hovsep J. Power take-off arrangement. 4,966,243, Cl. 180-53.100.
Mistretta, Joseph L. Sheeting head stripper wire adjuster. 4,966,541, Cl. 425-229.000.
Mistui Petrochemical Industries, Ltd.: *See*—
Hashimoto, Isao; Yokoyama, Keiichi; and Kitahara, Takumi, 4,966,968, Cl. 544-176.000.
Misumi, Hisashi: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.
Mita Industrial Co., Ltd.: *See*—
Arai, Kiyotaka, 4,966,359, Cl. 271-110.000.
Katafuchi, Toshinobu; and Hamakawa, Hiroyuki, 4,966,355, Cl. 271-3.100.
Mitake, Hiroshi, to Fuji Photo Film Co., Ltd. Injection mold having cooling fins. 4,966,544, Cl. 425-552.000.
Mitchell, Gil: *See*—
Kuze, Alexander; and Mitchell, Gil, 4,965,944, Cl. 33-760.000.
Mito, Yutaka: *See*—
Sato, Yoshiki; Yamamoto, Yoshitaka; Mito, Yutaka; and Tanabe, Harumasa, 4,966,978, Cl. 548-469.000.
Mitsubishi Chemical Industries Limited: *See*—
Wada, Keisuke; Onuma, Kazuhiko; Ushikubo, Takashi; and Ito, Tsuyoshi, 4,966,966, Cl. 536-119.000.
Mitsubishi Danki Kabushiki Kaisha: *See*—
Ban, Kazuhiro; and Ojima, Atsuo, 4,967,171, Cl. 333-116.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Inoue, Yasuo, 4,967,257, Cl. 357-42.000.
Komurasaki, Satoshi; and Ueda, Atsushi, 4,967,114, Cl. 310-329.000.
Koyama, Masahiro, 4,966,522, Cl. 415-121.200.
Mimura, Munehiko; Tatumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,967,357, Cl. 364-426.040.
Mizuochi, Hitoshi; and Higuchi, Hideyo, 4,966,863, Cl. 437-129.000.
Niki, Kenichi; Kokogawa, Toru; and Takasago, Hayato, 4,967,261, Cl. 357-70.000.
Ohdate, Mituo, 4,966,549, Cl. 432-253.000.
Ohmae, Katsuhiko, 4,966,040, Cl. 73-861.220.
Sadamori, Masaaki; Haze, Kenji; and Katamine, Tosinori, 4,966,669, Cl. 204-192.120.
Shimomura, Setsuhiro, 4,966,112, Cl. 123-339.000.
Shimura, Teruyuki, 4,967,254, Cl. 357-34.000.
Sonoda, Takuji; and Hayashi, Kazuo, 4,967,242, Cl. 357-22.000.
Sumita, Mutsutaka; and Kurachi, Takayoshi, 4,967,189, Cl. 340-679.000.
Tabuchi, Hiroshi, 4,967,285, Cl. 358-304.000.
Takagi, Hiroshi, 4,967,259, Cl. 357-68.000.
Tanaka, Seiichi, 4,967,129, Cl. 318-621.000.
Yamauchi, Shiro; Rito, Naotake; and Takahashi, Nobuyoshi, 4,967,295, Cl. 360-97.020.
Mitsubishi Gas Chemical Co., Inc.: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Iida, Kozo; Seto, Toru; and Obayashi, Yoshiaki, 4,966,873, Cl. 502-84.000.
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.
Mitsubishi Kasei Corporation: *See*—
Nagasaka, Hideki; and Ohta, Katsuko, 4,966,830, Cl. 430-281.000.
Otake, Masayuki, 4,966,990, Cl. 560-214.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, 4,966,500, Cl. 407-34.000.
Mitsubishi Pencil Co., Ltd.: *See*—
Kimura, Masaru; Konose, Yoshiomi; and Nakamura, Yuji, 4,966,175, Cl. 132-112.000.
Kimura, Masaru, 4,966,484, Cl. 401-273.000.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.
Mitsubishi Rayon Company, Ltd.: *See*—
Matsumoto, Tsuruyoshi; Yamamoto, Takashi; Sugimori, Teruhiko; and Shimada, Katsuhiko, 4,966,435, Cl. 350-96.340.
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, 4,966,432, Cl. 350-96.150.
Mitsuhashi, Yasuo: *See*—
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.
Mitsui Kinzoku Kogyo Kabushiki Kaisha: *See*—
Yamada, Shinjiro; and Satoh, Seiki, 4,966,266, Cl. 192-39.000.
Mitsui Petrochemical Ind., Ltd.: *See*—
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.
Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, 4,966,766, Cl. 424-422.000.
Iizuka, Hiroshi; Iwata, Tadao; and Ishiwata, Shuichi, 4,966,790, Cl. 427-386.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Ezawa, Hiroshi; Watanabe, Takayuki; Tsushima, Hiroaki; and Nishiba, Zyuzo, 4,966,805, Cl. 428-212.000.
Ono, Hiroshi; and Phala, Heng, 4,966,982, Cl. 549-274.000.
Takaki, Usaji; Aoki, Shinobu; Yamamoto, Yoshihiro; and Hara, Isao, 4,966,977, Cl. 548-457.000.
Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; Urakami, Tatsuhiro; and Yamaguchi, Akihiro, 4,966,961, Cl. 528-345.000.
Mitsutsuka, Syuichi, to Clarion Co., Ltd. Surface-acoustic-wave convolver. 4,967,113, Cl. 310-313.00R.
Mitsuyasu, Masaki; and Tsuzuki, Naoyuki, to Toyota Jidosha Kabushiki Kaisha. Fuel injection control device for use in an engine. 4,966,119, Cl. 123-498.000.
Miura, Hiroshi: *See*—
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, 4,966,899, Cl. 514-197.000.
Miwa, Masanori: *See*—
Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, 4,966,891, Cl. 514-49.000.
Miyake, Izumi: *See*—
Kaneko, Kiyotaka; Miyake, Izumi; Nakane, Yoshio; and Shimaya, Hiroshi, 4,967,294, Cl. 360-78.130.
Miyamoto, Ryoichi: *See*—
Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, 4,966,766, Cl. 424-422.000.
Miyasaka, Akihiro; and Ogawa, Hiroyuki, to Nippon Steel Corporation. Methods of producing clad metals. 4,966,748, Cl. 419-8.000.
Miyashita, Masamitu: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.
Miyazaki, Hiroya, to Nippon Seiko Kabushiki Kaisha. Displacement detection device. 4,966,041, Cl. 73-862.330.
Miyazaki, Nobuo: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.
Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Kenichi, to Ajinomoto Company, Ltd. Method for purifying L-glutamine. 4,966,994, Cl. 562-554.000.
Mizoshita, Yoshifumi: *See*—
Aruga, Keiji; Mizoshita, Yoshifumi; Iwatsubo, Masahito; and Hatagami, Toshifumi, 4,967,293, Cl. 360-78.120.
Mizuno, Mikizo: *See*—
Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.
Mizuochi, Hitoshi; and Higuchi, Hideyo, to Mitsubishi Denki Kabushiki Kaisha. Method for producing a semiconductor laser device. 4,966,863, Cl. 437-129.000.
Mizutani, Satoshi; and Nakada, Hiroaki, to King Jim Co., Inc. Binder assembly. 4,966,486, Cl. 402-68.000.
Mizutori, Youichi; and Sasaki, Takanori, to Kabushiki Kaisha Toshiba. Facsimile storage and exchange system. 4,967,288, Cl. 358-425.000.
MKS Instruments, Inc.: *See*—
Peacock, Roy N., 4,967,157, Cl. 324-460.000.
MM Systems Corporation: *See*—
Riddle, Jack D.; and Nicholas, John D., 4,965,976, Cl. 52-396.000.
Mobil Oil Corporation: *See*—
Audeh, Costandi A., 4,966,683, Cl. 208-251.00H.
Audeh, Costandi A., 4,966,684, Cl. 208-251.00H.
Avidan, Amos A.; and Yurchak, Sergei, 4,966,680, Cl. 208-71.000.
Child, Jonathan E., 4,966,087, Cl. 110-345.000.
Farng, Liehpao O.; and Horodysky, Andrew G., 4,966,721, Cl. 252-51.50R.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,966,681, Cl. 208-74.000.
Ho, Suzzy C.; and Wu, Margaret M., 4,967,032, Cl. 585-255.000.
Landis, Michael E.; Pelrine, Bruce P.; and Yan, Tsoung Y., 4,967,030, Cl. 585-241.000.
Marler, David O.; Sorensen, Charles M.; and Varghese, Philip, 4,967,020, Cl. 568-896.000.
Wu, Margaret M., 4,967,029, Cl. 585-12.000.
Wu, Wen-Pao, 4,966,546, Cl. 432-121.000.
Mochizuki, Kazuo, to TDK Corporation. Vibration sensor. 4,966,031, Cl. 73-35.000.
Modine Manufacturing Co.: *See*—
Hughes, Gregory G.; and Larrabee, Scott, 4,966,230, Cl. 165-150.000.
Moeller, Achim: *See*—
Herr, Dieter; Doerper, Thomas; Daum, Lothar; Geiss, Karl-Heinz; and Moeller, Achim, 4,966,894, Cl. 514-56.000.
Moeller Manufacturing Co., Inc.: *See*—
Hoszowski, Andrew K., 4,965,942, Cl. 33-730.000.
Mogamiya, Makoto: *See*—
Morisawa, Tahei; and Mogamiya, Makoto, 4,967,219, Cl. 354-199.000.
Mohan, Navaratnam C.; and Poole, Michael J., to BICC Public Limited Company. Insulating liquids and electric cables. 4,967,039, Cl. 174-25.00C.
Molecular Rx, Inc.: *See*—
McMichael, John, 4,966,753, Cl. 424-88.000.
Molinar, Tommy B.; and Johnston, Jerome E., to General Electrodynamics Corporation. Highly accurate weighing system. 4,967,384, Cl. 364-567.000.
MOLTECH Invent S. A.: *See*—
Bannochie, John G.; and Sherriff, Robert C., 4,966,674, Cl. 204-290.00R.
Monchalin, Jean-Pierre, to Canadian Patents and Development Limited-Societe Canadienne des Brevets et d'Exploitation Limitee. Broadband optical detection of transient motion from a scattering surface. 4,966,459, Cl. 356-358.000.
Monsanto Company: *See*—
Chou, Yueting, 4,966,731, Cl. 260-400.000.
Heidolph, Barbara B.; and Jakse, Frank P., 4,966,782, Cl. 426-551.000.
Wun, Tze-Chein; Kretzmer, Kuniko K.; and Broze, George J., Jr., 4,966,852, Cl. 435-235.000.
Montaldi, David H. One-piece disposable speculum. 4,966,130, Cl. 128-17.000.
Montean, Samuel, to Minnesota Mining and Manufacturing Company. Multi-directionally responsive, dual-status, magnetic article surveillance marker having continuous keeper. 4,967,185, Cl. 340-572.000.
Montedison S.p.A.: *See*—
Casagrande, Francesco; Foa, Marco; Gardano, Andrea; and Chapoy, L. Lawrence, 4,966,957, Cl. 528-193.000.
Monter, John M. Method of making an axial miniature fuse with plastic molded body. 4,965,925, Cl. 29-623.000.
Moore, Christopher P.; and Thomason, Derek A., to Eastman Kodak Company. Compositions and electrodes comprising organotin ionophores. 4,966,678, Cl. 204-418.000.
Moore, James A.; and Robello, Douglas, to Rensselaer Polytechnic Institute. Production and processing of thermally stable polyenaminonitriles and polyaminoquinolines therefrom. 4,966,954, Cl. 528-125.000.
Moore, James E. Methods and devices for using porous materials in the controlled feeding, distribution, and application of liquid agricultural chemicals. 4,965,960, Cl. 47-1.500.
Moore, Leslie G.: *See*—
Paruiski, Kenneth A.; Nutting, Thomas C.; and Moore, Leslie G., 4,967,264, Cl. 358-44.000.
Morgan, Peter J.; and Miller, Robert O., to Rockwell International Corporation. Semiconductor chip production and testing processes. 4,967,146, Cl. 324-158.00R.
Morgardshammar AB: *See*—
Danielsson, Kurt, 4,966,027, Cl. 72-249.000.
Mori, Atsushi, to Sanshin Kogyo Kabushiki Kaisha. Lubricating oil supply device for internal combustion engine. 4,966,105, Cl. 123-73.0AD.
Mori, Hideo: *See*—
Katsuma, Takashi; Mori, Hideo; Shimaohgi, Toshio; and Umezu, Naoaki, 4,967,120, Cl. 315-382.000.
Mori, Hiroshi, to Sony Corporation. Low level clamp circuit. 4,967,099, Cl. 307-264.000.
Mori, Kei. Light radiation stand. 4,966,450, Cl. 350-603.000.
Mori, Yasushi, to Nissan Motor Company Limited. Control system for automatic transmission producing shock-free shift. 4,967,356, Cl. 364-424.100.
Moribe, Hiroshi: *See*—
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.
Morikuni, Seiichi: *See*—
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, 4,966,899, Cl. 514-197.000.
Morimoto, Yutaka: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.
Morioka, Takayuki: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadsaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.

Morisawa, Tahei; and Mogamiya, Makoto, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera with zoom lens. 4,967,219, Cl. 354-199.000.

Morita, Hirotomo: *See*—
Sasaki, Masatomi; Morita, Hirotomo; and Matsumoto, Yutaka, 4,966,699, Cl. 210-321.800.

Moriyama, Yutaka, to Pioneer Electronic Corporation. Coupler terminal unit for speaker. 4,966,558, Cl. 439-573.000.

Morley, Bruce C.: *See*—
Sun, Horng-Jye; and Morley, Bruce C., 4,967,169, Cl. 333-28.00R.

Moroto, Masakazu: *See*—
Kikumoto, Makoto; Moroto, Masakazu; and Osumi, Masato, 4,966,145, Cl. 128-377.000.

Morris, David, to Habitat International, Inc. Golfer's putting practice device. 4,966,370, Cl. 273-176.00F.

Morris-Thurgood, Jayne A.: *See*—
Webb, Stuart C.; Lewis, Leland M.; and Morris-Thurgood, Jayne A., 4,966,146, Cl. 128-419.0PG.

Morse, Milton. Enhanced safety device for an electrical appliance. 4,967,308, Cl. 361-42.000.

Mosges, Helmut P.: *See*—
Kluttermann, Jurgen; and Mosges, Helmut P., 4,965,912, Cl. 19-159.00R.

Moss, Gaylord E.; Wreede, John E.; and Yu, Kevin, to Hughes Aircraft Company. Reverse light blocking hologram for a center high mounted stoplight. 4,966,426, Cl. 350-3.700.

Mostello, Robert A.: *See*—
Parker, Clayton E.; and Mostello, Robert A., 4,966,002, Cl. 62-31.000.

Moteki, Eiji, to Fuji Electric Company, Ltd. Head position controller for a disc storage unit. 4,967,292, Cl. 360-78.130.

Motoda Denshi Kogyo Kabushiki Kaisha: *See*—
Motoda, Kenro, 4,966,513, Cl. 414-277.000.

Motoda, Kenro, to Motoda Denshi Kogyo Kabushiki Kaisha. Indoor type mechanized storage facility. 4,966,513, Cl. 414-277.000.

Motomaru, Akira, to Canon Kabushiki Kaisha. Pallet for supporting article. 4,966,084, Cl. 108-51.300.

Motorola, Inc.: *See*—
Davies, Robert B.; Schultz, Warren J.; and Stipanuk, James J., 4,967,336, Cl. 363-132.000.
Lee, King F.; and Martin, Frederick L., 4,967,165, Cl. 331-66.000.
Lynk, Charles N.; and Heck, Joseph P., 4,967,407, Cl. 370-50.000.
Masquelier, Michael P.; and Okada, David N., 4,966,858, Cl. 437-27.000.
Pfiester, James R., 4,966,864, Cl. 437-191.000.

Mouchart, Jacques; Begel, Jacqueline; and Duda, Eugene, to Societe Anonyme dite: Alcatel Cit. Dielectric layer polarizer. 4,966,438, Cl. 350-173.000.

Moulin, Claude: *See*—
Ferrua, Bernard; and Moulin, Claude, 4,966,838, Cl. 435-7.000.

Mounger, Robert W.: *See*—
Lee, Robert D.; and Mounger, Robert W., 4,967,108, Cl. 307-520.000.

Mourer, David P.: *See*—
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.

Mowry, Greg S. Magnetic head with magnetoresistive sensor, inductive write head, and shield. 4,967,298, Cl. 360-113.000.

Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., to Cherry Corporation, The. Process for making insert molded circuit. 4,965,933, Cl. 29-882.000.

MTM Obermaier GmbH: *See*—
Magin, Berthold, 4,965,918, Cl. 26-18.500.

MTU Motoren-und Turbinen-Union Muenchen GmbH: *See*—
Merz, Herbert, 4,966,527, Cl. 416-241.00R.

Muckenfuhs, Delmar R., to Procter & Gamble Company, The. Easy open flexible bag. 4,966,286, Cl. 206-610.000.

Mudgett, Donald, to Lestox, Inc. Silicone mixture and method of using it. 4,966,638, Cl. 156-51.000.

Mueller, Wolfgang: *See*—
Risch, Lothar; Tielert, Reinhard; Mueller, Wolfgang; and Werner, Christoph, 4,966,859, Cl. 437-29.000.

Mulakken, Joy P. Compression/combustion assembly. 4,966,102, Cl. 123-18.00R.

Mulholland Designs, Inc.: *See*—
Mulholland, Lawrence K., 4,966,379, Cl. 280-242.100.

Mulholland, Lawrence K., to Mulholland Designs, Inc. Reclinable wheelchair. 4,966,379, Cl. 280-242.100.

Mullaly, James R.: *See*—
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., 4,966,229, Cl. 165-41.000.

Muller, Gottfried; and Hipp, Paul, to Schako Metallwarenfabrik Ferdinand Schad KG. Nozzle outlet. 4,966,069, Cl. 98-40.110.

Muller, Hubert: *See*—
Rispeter, Siegfried; Muller, Hubert; and Wust, Rainer, 4,966,270, Cl. 192-87.150.

Muller, Roland; Gries, Manfred; and Klein, Roland, to Sieber Verpackungstechnik GmbH & Co. KG. Method and apparatus for feeding strips to a packaging machine. 4,965,983, Cl. 53-435.000.

Muncke, Ludwig: *See*—
Kauss, Wolfgang; Muncke, Ludwig; Radtke, Dietrich; and Wittich, Kurt, 4,966,066, Cl. 91-516.000.

Murabayashi, Noboru: *See*—
Kanota, Keiji; and Murabayashi, Noboru, 4,967,289, Cl. 360-46.000.

Muragana, Tetsuro; and Tsutsumitake, Hideyuki, to Kabushiki Kaisha Toshiba. Method and apparatus for inference. 4,967,371, Cl. 364-513.000.

Murakami, Masatsugi: *See*—
Kawakami, Ken-ichi; Murakami, Masatsugi; and Takuwa, Kenji, 4,966,933, Cl. 524-310.000.

Murakami, Shinichi: *See*—
Sasaki, Yutaka; and Murakami, Shinichi, 4,967,237, Cl. 355-290.000.

Murakami, Yoshishige; Hirota, Kanji; and Nakamura, Masaaki, to Fujitsu Limited. Video signal mixing device for infrared/visible integrated imaging. 4,967,276, Cl. 358-183.000.

Murali, Venkatesan; Wei, Chih-Shih; and Fraser, David B., to Intel Corporation. Process for selective contact hole filling including a silicide plug. 4,966,868, Cl. 437-193.000.

Muramatsu, Shigeru: *See*—
Tani, Tatsuo; Watanabe, Mutsuo; and Muramatsu, Shigeru, 4,967,234, Cl. 355-260.000.

Murashima, Hirotsugu. Automatic focusing circuit. 4,967,279, Cl. 358-227.000.

Murata, Sunao: *See*—
Hayano, Fuminori; Imamura, Kazunori; and Murata, Sunao, 4,966,457, Cl. 356-237.000.

Murayama, Yoshimasa: *See*—
Kiguchi, Masashi; and Murayama, Yoshimasa, 4,967,141, Cl. 323-360.000.

Murphy, Kenneth J.: *See*—
Smith, Steven E.; and Murphy, Kenneth J., 4,967,347, Cl. 364-200.000.

Murrer, Edward S.; and Imran, Mir A., to DataTrak, Inc. Electronic door lock apparatus, system and method. 4,967,305, Cl. 361-172.000.

Mutter, Heinz: *See*—
Baumann, Heinz; Mutter, Heinz; Schreiber, Kurt; and Thurig, Peter, 4,966,206, Cl. 141-83.000.

Mycogen Corporation: *See*—
Payne, Jewel; Burrascano, Michelle; and Soares, George G., 4,966,765, Cl. 424-93.000.

Myer, Robert E.: *See*—
Bacher, Edward V.; and Myer, Robert E., 4,967,168, Cl. 333-26.000.

Na, Jong O.: *See*—
Lim, Jun Y.; and Na, Jong O., 4,966,575, Cl. 475-257.000.

Nagai, Yoshinobu: *See*—
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Nagao, Yoshiaki: *See*—
Kuzuya, Susumu; Nagao, Yoshiaki; Asakura, Hideo; and Hattori, Shigenori, 4,966,476, Cl. 400-208.000.

Nagaraj, D. R.: *See*—
Wang, Samuel S.; and Nagaraj, D. R., 4,966,938, Cl. 524-555.000.

Nagasaka, Hideki; and Ohta, Katsuko, to Mitsubishi Kasei Corporation. Photopolymerizable composition. 4,966,830, Cl. 430-281.000.

Nagasaki, Kunio: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, 4,966,281, Cl. 206-330.000.

Nagasaki, Nobutaka: *See*—
Keida, Haruo; Tsukamoto, Takashi; and Nagasaki, Nobutaka, 4,967,352, Cl. 364-200.000.

Nagasawa, Kiyoto: *See*—
Yoshida, Yoshiki; Asada, Kenichirou; and Nagasawa, Kiyoto, 4,967,284, Cl. 358-300.000.

Nagata, Koichi: *See*—
Ishii, Kenjiro; Fukumoto, Fumio; Nagata, Koichi; and Shibata, Akira, 4,967,228, Cl. 355-40.000.

Nagaya, Hideo: *See*—
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.

Nagayama, Yoshiharu: *See*—
Shibasaki, Nobuo; Tanaka, Toshio; Nagayama, Yoshiharu; and Yasunari, Kenjiro, 4,967,387, Cl. 364-580.000.

Nagira, Shigeo: *See*—
Fujita, Takayoshi; Nishinaka, Hisao; Ohota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, 4,965,919, Cl. 28-220.000.

Nahill, Thomas E.: *See*—
Krishnakumar, Suppayan M.; Nahill, Thomas E.; and Collette, Wayne N., 4,966,543, Cl. 425-522.000.

Naito, Ichiro; Kobayashi, Takahiko; and Maezawa, Hiroyuki, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering. Data name standardizing system. 4,967,348, Cl. 364-200.000.

Naito, Yasuo: *See*—
Mimura, Munehiko; Tatumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,967,357, Cl. 364-426.040.

Nakabayhashi, Hirotaka: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Nakada, Hiroaki: *See*—
Mizutani, Satoshi; and Nakada, Hiroaki, 4,966,486, Cl. 402-68.000.

Nakagawa, Kaoru: *See*—
Yokoyama, Sadayuki; and Nakagawa, Kaoru, 4,967,393, Cl. 365-185.000.

Nakagawa, Takehiro: *See—*
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Nakahara, Toshiaki: *See—*
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Nakai, Shuryo: *See—*
Durance, Timothy; Li-Chan, Eunice; and Nakai, Shuryo, 4,966,851, Cl. 435-206.000.

Nakamori, Toshio: *See—*
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Nakamura, Akira; and Matsuzawa, Junichi, to Takara Kosan Co., Ltd. Covered balloon. 4,966,568, Cl. 446-221.000.

Nakamura, Akira: *See—*
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,966,809, Cl. 428-323.000.

Nakamura, Ikushi: *See—*
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.

Nakamura, Keigo: *See—*
Ibusuki, Takashi; Nakamura, Keigo; and Kutsuna, Schuzou, 4,966,665, Cl. 204-157.300.

Nakamura, Masaaki: *See—*
Murakami, Yoshishige; Hirota, Kanji; and Nakamura, Masaaki, 4,967,276, Cl. 358-183.000.

Nakamura, Shigeo; and Yairo, Osamu, to Fanuc Ltd. Pre-drive circuit. 4,967,101, Cl. 307-270.000.

Nakamura, Shigeo: *See—*
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.

Nakamura, Shinji: *See—*
Mieno, Fumitake; Kurita, Kazuyuki; Nakamura, Shinji; and Shimizu, Atuo, 4,966,861, Cl. 437-99.000.

Nakamura, Tsuneo; Imae, Kazuyoshi; Deguchi, Haruhiko; and Kira, Tohru, to Sharp Kabushiki Kaisha. Process for producing thin film magnetic head. 4,966,648, Cl. 156-643.000.

Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, to Matsushita Electric Industrial Co., Ltd. Ultrasonic doppler blood flow velocity detection apparatus and a method for detecting blood flow velocity. 4,966,153, Cl. 128-661.090.

Nakamura, Yuji: *See—*
Kimura, Masaru; Konose, Yoshiomi; and Nakamura, Yuji, 4,966,175, Cl. 132-112.000.

Nakane, Yoshio: *See—*
Kaneko, Kiyotaka; Miyake, Izumi; Nakane, Yoshio; and Shimaya, Hiroshi, 4,967,294, Cl. 360-78.130.

Nakano, Kazuo. Apparatus for converting extrinsic useless oscillation motions into useful torque. 4,966,254, Cl. 185-30.000.

Nakano, Masaru: *See—*
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.

Nakano, Michinobu; and Katoh, Kazuo, to Nippon Kayaku Kabushiki Kaisha. Superoxide dismutase composition. 4,966,774, Cl. 424-601.000.

Nakatani, Keiji, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 4,967,287, Cl. 358-401.000.

Nakatsukasa, Keiichiroh; and Matsumoto, Takao, to Ranco Japan Ltd. Four-way switching valve device. 4,966,194, Cl. 137-625.430.

Nakazawa, Masashi: *See—*
Ohta, Wasaburo; and Nakazawa, Masashi, 4,966,095, Cl. 118-723.000.

Nalco Chemical Company: *See—*
Hoots, John E.; Banks, Rodney H.; and Johnson, Donald A., 4,966,711, Cl. 210-697.000.

Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, to Daicel Chemical Industries, Ltd. Separation agent comprising acyl- or carbamoyl-substituted polysaccharide. 4,966,694, Cl. 210-198.200.

Nania, Daniela, to Dynatherm Systems U.S.A. Ltd. Prefabricated dome-shaped structure. 4,965,970, Cl. 52-82.000.

Nanjo, Katsumi: *See—*
Onodera, Nobuo; Nanjo, Katsumi; Kariya, Akinori; and Kanase, Kiyoshi, 4,966,896, Cl. 514-469.000.

Nanostructures, Inc.: *See—*
Mauger, Philip E., 4,966,663, Cl. 204-129.300.

Narumiya, Masao; and Kiyohara, Toshimi, to Sharp Kabushiki Kaisha. Network system of programmable controllers. 4,967,409, Cl. 370-085.600.

Naruse, Hiroshi: *See—*
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.

Nassar, Marcos A.: *See—*
Park, Kyong; Nassar, Marcos A.; and Sun, Cliff C., 4,967,071, Cl. 250-227.210.

National Research Council Canada/Conseil National de Recherches Canada: *See—*
Beraldin, J. Angelo; and Blais, Francois, 4,967,066, Cl. 250-205.000.

National Research Development Corporation: *See—*
Turner, John J.; and Turner, Mary J. A., 4,966,580, Cl. 604-67.000.

National Science Council: *See—*
Chang, Yin; and Fu, Yao A., 4,966,453, Cl. 351-242.000.

National Semiconductor Corporation: *See—*
Levit, Boris; and Millerick, Michael A. C., 4,966,672, Cl. 204-198.000.

Nau, Keith A.: *See—*
Buchar, Wayne A.; Nau, Keith A.; and Lavallee, Pierre A., 4,967,233, Cl. 355-233.000.

NCR Corporation: *See—*
Collins, Donald A., Jr., 4,967,188, Cl. 340-636.000.
Schuhmacher, Chris A.; and Aleshire, Rex A., 4,967,076, Cl. 250-236.000.

NEC Corporation: *See—*
Haruki, Toshihiro, 4,967,194, Cl. 340-825.440.
Matsuura, Hideki, 4,967,110, Cl. 307-592.000.
Otani, Susumu, 4,967,413, Cl. 371-37.400.
Shimizu, Toshiyuki, 4,967,248, Cl. 357-23.600.
Tamegaya, Yukio, 4,967,106, Cl. 307-455.000.
Tanaka, Akio, 4,967,246, Cl. 357-23.400.

NEC Environment Engineering, Ltd.: *See—*
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.

Neeman, Avraham, to Dan Mamtirim. Microsprayers for use in irrigation. 4,966,328, Cl. 239-524.000.

Negishi, Hideo: *See—*
Hasegawa, Takanori; and Negishi, Hideo, 4,966,073, Cl. 101-120.000.

Neifeld, Richard A., to United States of America, Army. Microwave transmission line and method of modulating the phase of a signal passed through said line. 4,967,167, Cl. 332-144.000.

Nepomuceno, Jose G.: *See—*
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 4,966,170, Cl. 131-88.000.

Nero, Leroy W., to RCA Licensing Corporation. Isolating high voltage transformer for video apparatus. 4,967,121, Cl. 315-411.000.

Neste OY: *See—*
Karna, Toivo; Nieminen, Jukka-Pekka; Maisti, Asko; and Kahonen, Hannu, 4,966,346, Cl. 248-503.000.

Nestec S.A.: *See—*
Frisch, Martin, 4,966,070, Cl. 99-302.00R.

Neukermans, Armand P.: *See—*
Berger, Josef; Neukermans, Armand P.; and Vaught, John L., 4,967,095, Cl. 250-572.000.

Neusy, Hubert, to Glaverbel. Process of manufacturing vitreous beads. 4,966,617, Cl. 65-21.300.

Newco of Janesville, Inc.: *See—*
Baer, Thomas R., 4,966,309, Cl. 272-85.000.

Ngai, Chuck H.; Wassel, Edward R.; and Watkins, Gerald J., to International Business Machines Corp. Pipelined parallel vector processor including parallel configured element processors for processing vector elements in parallel fashion. 4,967,343, Cl. 364-200.000.

NGK Spark Plug Co. Ltd.: *See—*
Oshima, Takafumi, 4,967,116, Cl. 313-141.000.

Nguyen, Long P. Suction aspirator with noise-control valve. 4,966,584, Cl. 604-119.000.

Nguyen, Luy B., to Wheelock, Inc. Audiovisual signaling device and method. 4,967,177, Cl. 340-326.000.

Nicholas, John D.: *See—*
Riddle, Jack D.; and Nicholas, John D., 4,965,976, Cl. 52-396.000.

Nicoli, Anthony M.: *See—*
Reilly, David M.; Nicoli, Anthony M.; Schulze, Richard G.; and Goldenberg, Barbara L., 4,967,089, Cl. 250-493.100.

Nielsen, Erik. Yawing device and method of controlling it. 4,966,525, Cl. 416-9.000.

Nieminen, Jukka-Pekka: *See—*
Karna, Toivo; Nieminen, Jukka-Pekka; Maisti, Asko; and Kahonen, Hannu, 4,966,346, Cl. 248-503.000.

Nieuwkoop, Anthony J.: *See—*
Stacey, Gary; Nieuwkoop, Anthony J.; and Banfalvi, Zsofia, 4,966,847, Cl. 435-172.300.

Nightingill, Leslie: *See—*
Omura, Jimmy K.; Nightingill, Leslie; and Sabin, Michael J., 4,967,389, Cl. 364-900.000.

Nihon Parkerizing Co., Ltd.: *See—*
Saeki, Kenshi; Kawasaki, Iwao; Shikaze, Yoshikazu; and Sugaya, Mamoru, 4,966,634, Cl. 148-251.000.

Niki, Kenichi; Kokogawa, Toru; and Takasago, Hayato, to Mitsubishi Denki Kabushiki Kaisha. Tape carrier for assembling an IC chip on a substrate. 4,967,261, Cl. 357-70.000.

Nikon Corporation: *See—*
Hayano, Fuminori; Imamura, Kazunori; and Murata, Sunao, 4,966,457, Cl. 356-237.000.
Ishiguro, Yasuaki, 4,967,215, Cl. 354-173.100.
Kuwata, Chiyuki, 4,967,226, Cl. 354-406.000.

Niles Parts Co., Ltd.: *See—*
Saito, Masatsugu; Ikeda, Chikamasa; Takeoka, Seiei; and Katsutani, Kazuji, 4,967,178, Cl. 340-425.500.

Ninomiya, Masashi: *See—*
Hanyu, Susumu; and Ninomiya, Masashi, 4,966,089, Cl. 112-444.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Nakano, Michinobu; and Katoh, Kazuo, 4,966,774. Cl. 424-601.000.
Nippon Oil Co., Ltd.: *See*—
Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, 4,966,679, Cl. 208-58.000.
Nippon Petrochemicals Company, Limited: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,967,028, Cl. 585-6.300.
Shimizu, Isoo; Matsumura, Yasuo; and Iwamoto, Kouichi, 4,967,009, Cl. 568-309.000.
Nippon Pharmaceutical Development Institute Co., Ltd.: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,966,900, Cl. 514-206.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Miyazaki, Hiroya, 4,966,041, Cl. 73-862.330.
Tokugawa, Osamu, 4,966,393, Cl. 280-801.000.
Nippon Shokubai Kagaku Kogyo Co. Ltd.: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.
Nippon Shokubai Kagaku Kogyo Kabushiki Kaisha: *See*—
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, 4,966,712, Cl. 210-705.000.
Nippon Steel Corporation: *See*—
Miyasaka, Akihiro; and Ogawa, Hiroyuki, 4,966,748, Cl. 419-8.000.
Nishino, Taneharu, 4,966,026, Cl. 72-224.000.
Nippon Telegraph and Telephone Public Corporation: *See*—
Yonechi, Shinichi; Ishida, Yukinori; and Kawase, Masaaki, 4,966,434, Cl. 350-96.230.
Nishiba, Zyuzo: *See*—
Ezawa, Hiroshi; Watanabe, Takayuki; Tsushima, Hiroaki; and Nishiba, Zyuzo, 4,966,805, Cl. 428-212.000.
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, to Nippon Shokubai Kagaku Kogyo Kabushiki Kaisha. Flotation collector and method for treatment of inorganic substance-containing water system by use thereof. 4,966,712, Cl. 210-705.000.
Nishida, Masaaki: *See*—
Hayakawa, Youichi; Hosono, Chihiro; Nishida, Masaaki; and Kato, Kozo, 4,966,264, Cl. 192-3.340.
Nishide, Kazuhiro: *See*—
Hirano, Takashi; Taguchi, Michio; and Nishide, Kazuhiro, 4,967,383, Cl. 364-567.000.
Nishigai, Masao: *See*—
Otani, Tamio; Nishigai, Masao; and Kanaya, Yasuhiko, 4,966,508, Cl. 409-189.000.
Nishikawa, Kazuya: *See*—
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,967,202, Cl. 343-713.000.
Nishikawa, Tadashi: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Nishikawa, Takami: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.
Nishimura, Tetsuharu, to Canon Kabushiki Kaisha. Interferometric rotating condition detection apparatus. 4,967,072, Cl. 250-231.160.
Nishimura, Yutaka; Ohsuga, Minoru; and Ohyama, Yoshishige, to Hitachi, Ltd. Air flow metering apparatus for internal combustion engines. 4,966,033, Cl. 73-118.200.
Nishinaka, Hisao: *See*—
Fujita, Takayoshi; Nishinaka, Hisao; Ohota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, 4,965,919, Cl. 28-220.000.
Nishino, Taneharu, to Nippon Steel Corporation. Edging roll for use in making sections having flanges. 4,966,026, Cl. 72-224.000.
Nishio, Tetsuya; Kiuchi, Masayoshi; and Ohara, Tsunemasa, to Canon Kabushiki Kaisha. Camera system. 4,967,216, Cl. 354-173.100.
Nissan Motor Co., Ltd.: *See*—
Aruga, Tatsuo; and Iwasa, Yoshio, 4,966,106, Cl. 123-90.310.
Etoh, Yoshiyuki, 4,967,358, Cl. 364-426.040.
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.
Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, 4,967,360, Cl. 364-424.050.
Hayasaki, Koichi, 4,966,263, Cl. 192-3.300.
Hirano, Yoshinori, 4,966,251, Cl. 180-338.000.
Imajo, Minoru, 4,966,107, Cl. 123-90.450.
Imaseki, Takashi, 4,966,249, Cl. 180-233.000.
Imaseki, Takashi, 4,966,250, Cl. 180-233.000.
Iwasa, Yoshio, 4,967,056, Cl. 219-203.000.
Kawamura, Yoshihisa, 4,966,117, Cl. 123-425.000.
Mori, Yasushi, 4,967,356, Cl. 364-424.100.
Seko, Yasutoshi, 4,967,319, Cl. 362-61.000.
Shigesada, Masaaki, 4,966,832, Cl. 430-323.000.
Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, 4,967,359, Cl. 364-424.050.
Takahashi, Hiroshi, 4,966,049, Cl. 74-866.000.
Takeuchi, Kiyoshi, 4,966,032, Cl. 73-64.000.
Nisset Plan, Inc.: *See*—
Hihara, Mikio; and Suzuki, Nobuhisa, 4,966,463, Cl. 366-3.000.
Nisshin Steel Co., Ltd.: *See*—
Setsuko, Takahashi; Kikuko, Akimoto; Kumiko, Mori; and Ryozo, Akama, 4,966,660, Cl. 204-34.000.
Nitsch, Wilhelm, to Agfa-Gevaert AG. Method of and machines for treating webs of photographic material. 4,967,222, Cl. 354-321.000.
Nitto Denko Corporation: *See*—
Kawanishi, Michirou; Aizawa, Kaoru; Araki, Kyoichi; Kamei, Kiyohiro; and Nagasaki, Kunio, 4,966,281, Cl. 206-330.000.
Kawanishi, Michirou; Aizawa, Kaoru; and Kurono, Tatsuo, 4,966,282, Cl. 206-330.000.
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, to Spectrum Sciences. Liquid toner composition containing two different charge directors. 4,966,824, Cl. 430-115.000.
Niven, Ian; E.: *See*—
Garner-Gray, Peter F.; Knight, Peter C.; and Niven, Ian; E., 4,966,606, Cl. 252-174.140.
Niwa, Takashi: *See*—
Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.
Nix, James L.: *See*—
Lopez, Rudolph M.; Nix, James L.; and Weinstein, Robert E., 4,967,301, Cl. 360-128.000.
Nixdorf Computer AG: *See*—
Pawlowski, Adam, 4,966,360, Cl. 271-272.000.
Nofzinger, Scott L., to Prestolite Electric Incorporated. Battery equalization circuit for a dual voltage charging system. 4,967,136, Cl. 320-6.000.
Noguchi, Keiichiro: *See*—
Takasuga, Shunzo; Sugimoto, Yukihiro; Noguchi, Keiichiro; and Urabe, Motohmi, 4,966,221, Cl. 164-120.000.
Noguera, Norlan. Video cassette recorder support mechanism. 4,966,342, Cl. 248-172.000.
Nomula, Ram R.; Hamersley, Alan B.; and Rudd, Gordon, to Disctronics Manufacturing, Inc. Method and apparatus for forming a digital image on an optical recording disc. 4,967,286, Cl. 358-342.000.
Nomura, Akihiro; and Kiyohara, Toshimi, to Sharp Kabushiki Kaisha. Character drawing method. 4,967,374, Cl. 364-518.000.
Nomura, Masakatsu: *See*—
Ashikaga, Tadashi; and Nomura, Masakatsu, 4,967,135, Cl. 318-808.000.
Nomura, Toshio; and Chudo, Masuo, to Sumitomo Electric Industries, Ltd. Coated cemented carbide tool. 4,966,501, Cl. 407-119.000.
Norcross, Roy: *See*—
Ahsan, M. Quamrul; Griffiths, Andrew; Haug, Ernest; and Norcross, Roy, 4,966,715, Cl. 210-721.000.
Norden, Alexander R., to Connectron, Inc. Fuse holders. 4,966,561, Cl. 439-622.000.
Nordstrom, Orvar, to Saab-Scania Aktiebolag. Arrangement for suspension of a door on a vehicle body. 4,966,403, Cl. 296-76.000.
Normand, Gaudry. Futon with inflatable core. 4,965,901, Cl. 5-465.000.
Norris, Charles: *See*—
Humble, Raymond; Hudson, Main; and Norris, Charles, 4,966,336, Cl. 242-295.000.
Northern Precision Twin Cities Inc.: *See*—
Staggs, R. William, 4,966,055, Cl. 76-80.500.
Northern Telecom Limited: *See*—
Phan, Khue V., 4,967,408, Cl. 370-62.000.
Northgate Research, Inc.: *See*—
Nowacki, Christopher; and Brisson, Alfred G., 4,966,132, Cl. 128-24.00A.
Nose, Yukihiko; Malchesky, Paul S.; and Horiuchi, Takashi, to Cleveland Clinic Foundation, The. Thermofiltration of plasma. 4,966,709, Cl. 210-651.000.
Novick, Vincent J., to United States of America, Energy. Series cell light extinction monitor. 4,966,462, Cl. 356-437.000.
Novikova, Svetlana A.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Nowacki, Christopher; and Brisson, Alfred G., to Northgate Research, Inc. Remote spark shock wave generator. 4,966,132, Cl. 128-24.00A.
Nozaki, Toshio: *See*—
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.
Nozokido, Yutaka: *See*—
Akitaya, Shinichi; Fukazawa, Toru; Nozokido, Yutaka; and Tabata, Nobuchika, 4,966,931, Cl. 524-100.000.
nuArc Company, Inc.: *See*—
Meacham, G. B. Kirby, 4,967,230, Cl. 355-91.000.
Nugent, James E.: *See*—
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 4,965,922, Cl. 29-426.400.
Numako, Norio; and Kobayashi, Takeo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Lens driving motor control apparatus. 4,967,218, Cl. 354-195.100.
Nutech Energy Systems Inc.: *See*—
Robertson, Michael K.; and Henderson, Robert B., 4,966,759, Cl. 422-186.000.
Nuttin, Pierre, to Fobelmac Consulting AG. System for processing a web. 4,966,352, Cl. 270-1.100.
Nutting, Thomas C.: *See*—
Parulski, Kenneth A.; Nutting, Thomas C.; and Moore, Leslie G., 4,967,264, Cl. 358-44.000.

Nyitray, Alice M.: *See*—
Williams, Joel M., Jr.; Nyitray, Alice M.; and Wilkerson, Mark H., 4,966,919, Cl. 521-54.000.
Nylander, Claes I.; and Burns, Ian W., to Unilever Patent Holdings. Method and apparatus for electrochemical analysis. 4,966,671, Cl. 204-153.140.
O. C. S. Operators, Inc.: *See*—
Stelzer, Clarence F., Jr., 4,966,496, Cl. 405-227.000.
Obara, Haruki; and Izumiya, Syunzo, to Fanuc Ltd. Electric-discharge-machining power source. 4,967,054, Cl. 219-69.130.
Obara, Tsuneo, to Fuji Xerox Co., Ltd. Copying apparatus with conveyer for conveying originals to predetermined copying position. 4,967,232, Cl. 355-233.000.
Obata, Hiroyuki: *See*—
Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.
Obayashi, Yoshiaki: *See*—
Iida, Kozo; Seto, Toru; and Obayashi, Yoshiaki, 4,966,873, Cl. 502-84.000.
Obergfell, Rainer; Panse, Hubert; and Schlegel, Wolfgang, to Siemens Aktiengesellschaft. Switched-mode regulator with inductor current simulation circuit. 4,967,138, Cl. 323-224.000.
Oberlinner, Andreas: *See*—
Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, 4,966,983, Cl. 549-389.000.
Obray, Dean C.: *See*—
Houghton, Richard B.; and Obray, Dean C., 4,966,131, Cl. 128-24.00A.
Ockels, Wubbo, to Agence Spatiale Europeenne. Pressurized spacesuit fitted with variable pressure gloves for improved dexterity. 4,965,886, Cl. 2-2.10A.
Ocular Instruments, Inc.: *See*—
Shields, M. Bruce; and Erickson, Phillip J., 4,966,452, Cl. 351-219.000.
Oesterreichische Investitionskredit Aktiengesellschaft: *See*—
Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., 4,967,088, Cl. 250-491.100.
Ogawa, Hiroshi; and Sako, Yoichiro, to Sony Corporation. Multi-format optical disk and reading device. 4,967,403, Cl. 369-44.260.
Ogawa, Hiroyuki: *See*—
Miyasaka, Akihiro; and Ogawa, Hiroyuki, 4,966,748, Cl. 419-8.000.
Ohara, Tsunemasa: *See*—
Nishio, Tetsuya; Kiuchi, Masayoshi; and Ohara, Tsunemasa, 4,967,216, Cl. 354-173.100.
Ohashi, Masayuki: *See*—
Kawaguchi, Yasuyoshi; Ohashi, Masayuki; and Tansei, Hikaru, 4,966,213, Cl. 152-504.000.
Ohdate, Mituo, to Mitsubishi Denki Kabushiki Kaisha. Wafer hanger useful for thermally treating semiconductor wafers. 4,966,549, Cl. 432-253.000.
Ohio Bell Telephone Company, The: *See*—
Marshall, Loren M.; and Wolfe, William A., 4,966,562, Cl. 439-718.000.
Ohira, Katuzi: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,966,809, Cl. 428-323.000.
Ohkawa, Shigenori: *See*—
Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,966,973, Cl. 546-269.000.
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, to Bayer Aktiengesellschaft. DHP delayed release preparation. 4,966,772, Cl. 424-482.000.
Ohmachi, Kazuhiko: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Ohmae, Katsuhiko, to Mitsubishi Denki Kabushiki Kaisha. Karman vortex flowmeter with signal waveform shaper circuit. 4,966,040, Cl. 73-861.220.
Ohoshima, Ryoichiro: *See*—
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Ohota, Michio: *See*—
Fujita, Takayoshi; Nishinaka, Hisao; Ohota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, 4,965,919, Cl. 28-220.000.
Ohshiro, Katsuhiko: *See*—
Suzuki, Shigeru; Ohshiro, Katsuhiko; and Watanabe, Yasushi, 4,966,531, Cl. 417-295.000.
Ohsone, Tadashi: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Ohsuga, Minoru: *See*—
Nishimura, Yutaka; Ohsuga, Minoru; and Ohyama, Yoshishige, 4,966,033, Cl. 73-118.200.
Ohta, Katsuko: *See*—
Nagasaka, Hideki; and Ohta, Katsuko, 4,966,830, Cl. 430-281.000.
Ohta, Wasaburo; and Nakazawa, Masashi, to Ricoh Company, Ltd. Apparatus for forming a thin film. 4,966,095, Cl. 118-723.000.
Ohtake, Junzo: *See*—
Masamoto, Junzo; Ohtake, Junzo; and Kawamura, Mamoru, 4,967,014, Cl. 568-458.000.
Ohtsuka, Ichiyo: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.
Ohyabu, Keiji; Watarai, Shinichi; and Sano, Hideaki, to Fujitsu Limited. Apparatus for selectively feeding cut sheets in a recording machine. 4,966,356, Cl. 271-9.000.
Ohyama, Yoshishige: *See*—
Nishimura, Yutaka; Ohsuga, Minoru; and Ohyama, Yoshishige, 4,966,033, Cl. 73-118.200.
Ohzeki, Jurou, to Asahi Kasei Kogyo Kabushiki Kaisha. Electroless plating-susceptive, fire retardant polyphenylene ether resin. 4,966,814, Cl. 428-457.000.
Oikawa, Ryuetsu; Ikari, Akira; and Sasaki, Touru, to Yazaki Corporation. Grommet. 4,966,374, Cl. 277-178.000.
Ojima, Atsuo: *See*—
Ban, Kazuhiro; and Ojima, Atsuo, 4,967,171, Cl. 333-116.000.
Oka, Takeshi, to Bridgestone Corporation. Tire pair for a two-wheeled vehicle. 4,966,215, Cl. 152-538.000.
Okada, David N.: *See*—
Masquelier, Michael P.; and Okada, David N., 4,966,858, Cl. 437-27.000.
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, to Mitsubishi Rayon Company, Ltd. Optical coupler and process for preparation thereof. 4,966,432, Cl. 350-96.150.
Okamoto, Hideaki: *See*—
Terasawa, Koji; Okamoto, Hideaki; and Yamaguchi, Hideki, 4,967,204, Cl. 346-1.100.
Okamoto, Ichiro: *See*—
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 4,966,694, Cl. 210-198.200.
Okamoto Industries, Inc.: *See*—
Sekido, Hiroshi; and Hioki, Toshimichi, 4,965,899, Cl. 5-453.000.
Okamoto, Kenzo; and Kitada, Fumihiko, to Imanishi Kinzoku Kogyo Kabushiki Kaisha. High frequency cooking device with ceiling mounted semi-spherical reflector. 4,967,050, Cl. 219-10.55F.
Okamura, Kazuo: *See*—
Maeda, Tadayuki; Koyama, Satoshi; and Okamura, Kazuo, 4,967,025, Cl. 570-177.000.
Okawara, Hiroshi: *See*—
Ozawa, Kaoru; and Okawara, Hiroshi, 4,967,312, Cl. 361-399.000.
OKI Electric Industry Co., Ltd.: *See*—
Tanagawa: Kouzi, 4,967,415, Cl. 371-51.100.
OKI Electric Industry Co., Ltd: *See*—
Kuwabara, Hiroshi; and Kitazawa, Shooji, 4,967,399, Cl. 365-230.060.
Okita, Masao; Omori, Shinichi; and Yunokuchi, Ryu, to Alps Electric Co., Ltd. Magnetic disk head positioning device. 4,967,297, Cl. 360-106.000.
Oklejas, Eli, Jr.: *See*—
Oklejas, Robert A.; and Oklejas, Eli, Jr., 4,966,708, Cl. 210-637.000.
Oklejas, Robert A.; and Oklejas, Eli, Jr. Power recovery pump turbine. 4,966,708, Cl. 210-637.000.
Okuda, Masaaki, to Tayca Corporation. Anticorrosive pigment composition and an anticorrosive coating composition containing the same. 4,966,630, Cl. 106-426.000.
Okumura, Yoshiharu: *See*—
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.
Okuno, Sumio: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Okutsu, Mitsuhiko; Kariya, Tadaaki; Kawamoto, Kouji; Kaneko, Syuzoh; and Mashiko, Yasuhiro, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Capacitive load driving apparatus. 4,967,100, Cl. 307-270.000.
Okuyama, Takashi; and Yamauchi, Yutaka, to Central Glass Company, Limited. Heat treatment method using a zoned tunnel. 4,966,547, Cl. 432-9.000.
Olah, Andrew M.: *See*—
Gregoli, Armand A.; Olah, Andrew M.; Hamshar, John A.; and Rimmer, Daniel P., 4,966,235, Cl. 166-267.000.
Olin Corporation: *See*—
Cheskis, Harvey P.; Watson, W. Gary; and Sankaranarayanan, Ashok, 4,966,224, Cl. 164-429.000.
Reed, Emily J.; and Helmstetter, David A., 4,966,764, Cl. 423-499.000.
Oliver Rubber Company: *See*—
Hill, Gilbert L., 4,966,640, Cl. 156-394.100.
Olschewski, Armin: *See*—
Kunkel, Heinrich; and Olschewski, Armin, 4,966,572, Cl. 474-199.000.
Olson, Robert A.; and Lutz, Lewin R., III, to P.H. Glatfelter Company. Method of paper making using an abrasive refiner for refining bleached thermochemical hardwood pulp. 4,966,651, Cl. 162-28.000.
Olympus Optical Co., Ltd.: *See*—
Sakai, Mitsugu; Karaki, Koichi; and Sasaki, Yasuo, 4,966,038, Cl. 73-606.000.
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Omni Products International, Inc.: *See*—
Schwartz, Larry A.; and Lesser, Bertram, 4,966,414, Cl. 297-445.000.
Schwartz, Larry A.; and Lesser, Bertram, 4,966,415, Cl. 297-445.000.
Omori, Shinichi: *See*—
Okita, Masao; Omori, Shinichi; and Yunokuchi, Ryu, 4,967,297, Cl. 360-106.000.
Omron Tateisi Electronics Co.: *See*—
Sawai, Kenji; and Itoh, Jinichi, 4,967,128, Cl. 318-609.000.
Omura, Jimmy K.; Nightingill, Leslie; and Sabin, Michael J., to Cylink Corporation. Bit density controller. 4,967,389, Cl. 364-900.000.
Onada Alc Co., Ltd.: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.
Onada Cement Co., Ltd: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.
Onishi, Akira: *See*—
Ito, Tsukasa; Kawakatsu, Satoshi; Onishi, Akira; and Takekoshi, Masayo, 4,966,856, Cl. 436-170.000.
Ono, Hiroshi; and Phala, Heng, to Mitsui Toatsu Chemicals, Incorporated. Process for the production of lactide. 4,966,982, Cl. 549-274.000.
Ono, Kazuya: *See*—
Kitagawa, Katugi; Akutagawa, Ichiro; and Ono, Kazuya, 4,966,928, Cl. 523-437.000.
Ono, Mitsunori: *See*—
Shinoki, Hiroshi; and Ono, Mitsunori, 4,966,607, Cl. 8-549.000.
Ono, Yasuichi: *See*—
Yoshioka, Kenji; and Ono, Yasuichi, 4,967,117, Cl. 313-506.000.
Ono, Yoichi; Fujii, Kunio; Hinata, Shoji; and Wakabayashi, Satoshi, to Seiko Epson Corporation. Electro-optical device and method for manufacturing same. 4,966,442, Cl. 350-339.00R.
Onodera, Nobuo; Nanjo, Katsumi; Kariya, Akinori; and Kanase, Kiyoshi, to Agro-Kanesho Company, Ltd. Derivative of N-methylcarbamate and insecticide containing the same. 4,966,896, Cl. 514-469.000.
Onuma, Kazuhiko: *See*—
Wada, Keisuke; Onuma, Kazuhiko; Ushikubo, Takashi; and Ito, Tsuyoshi, 4,966,966, Cl. 536-119.000.
Ooshima, Nobuyasu: *See*—
Tanaka, Takahumi; and Ooshima, Nobuyasu, 4,966,090, Cl. 112-456.000.
Optima Industries, Inc.: *See*—
Marantette, William F., 4,967,154, Cl. 324-207.120.
Orlando, Franklin P.: *See*—
Butler, Lee D.; Orlando, Franklin P.; and Lenker, Don H., 4,965,993, Cl. 56-327.100.
Orlans, Yitzhak: *See*—
Goodman, Geoffrey; Cagan, Uri; and Orlans, Yitzhak, 4,966,701, Cl. 210-419.000.
Orlicki, David M.; and Fearnside, William T., to Eastman Kodak Company. Focus/tracking servo automatic gain control for optical recording. 4,967,404, Cl. 369-44.110.
Orlovsky, Jury V.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.
Oron, David: *See*—
Karasik, Alexander; and Oron, David, 4,966,406, Cl. 296-98.000.
Osaki, Akira: *See*—
Ishihara, Heigo; Osaki, Akira; and Kudo, Takanori, 4,966,797, Cl. 427-64.000.
Osborne, William T., to Baltimore Aircoil Company, Inc. Absorption refrigeration method and apparatus. 4,966,007, Cl. 62-101.000.
Oscar Mayer Foods Corporation: *See*—
Thompson, Bjorn J.; Hustad, Gerald O.; and Marnocha, Todd S., 4,966,470, Cl. 383-61.000.
Oshima, Junji: *See*—
Sasaki, Ichiro; Oshima, Junji; and Yamada, Minoru, 4,966,942, Cl. 525-67.000.
Oshima, Takafumi, to NGK Spark Plug Co. Ltd. Spark plug having heat- and corrosion-resistant surface. 4,967,116, Cl. 313-141.000.
Oshita, Saiichiro: *See*—
Kamimura, Katsuyoshi; Oshita, Saiichiro; Mine, Atsushi; Hiwatashi, Yutaka; and Konno, Toshihiro, 4,967,361, Cl. 564-424.050.
Osseyran, Anwar: *See*—
Sauerwald, Wilhelm A.; Osseyran, Anwar; Eerenstein, Lars A. R.; and De Jong, Franciscus G. M., 4,967,142, Cl. 324-73.100.
Osman, Kenneth R.: *See*—
Rees, James D.; Lehman, Richard F.; and Osman, Kenneth R., 4,967,265, Cl. 358-75.000.
Ostariz, Jose L. S.: *See*—
Andreu, Enrique M.; Gomez, Fernando N.; Vallejo, Jose L. R.; and Ostariz, Jose L. S., 4,966,956, Cl. 528-185.000.
Ostergaard, Hans Jorgen. Method, a compound, and a blowing agent for making plastic foam. 4,966,921, Cl. 521-131.000.
Osugi, Kazuhiko: *See*—
Hasegawa, Hiroaki; Sakai, Norio; and Osugi, Kazuhiko, 4,966,794, Cl. 428-15.000.
Osumi, Masato: *See*—
Kikumoto, Makoto; Moroto, Masakazu; and Osumi, Masato, 4,966,145, Cl. 128-377.000.
Otake, Katsumi; and Iwakami, Nobuyuki, to Fuji Photo Film Co., Ltd. Container having index sheet and recording medium. 4,966,285, Cl. 206-455.000.
Otake, Masayuki, to Mitsubishi Kasei Corporation. Process for producing methacrylic acid and/or methacrylic acid ester. 4,966,990, Cl. 560-214.000.
Otani, Susumu, to NEC Corporation. Burst signal detection apparatus. 4,967,413, Cl. 371-37.400.
Otani, Tamio; Nishigai, Masao; and Kanaya, Yasuhiko, to Hitachi Seiko, Ltd. Work holding device for cutting printed boards. 4,966,508, Cl. 409-189.000.
Ott, Hans, to GRETAG Aktiengesellschaft. Process for the ink control or regulation of a printing machine by comparing desired color to obtainable color data. 4,967,379, Cl. 364-526.000.
Outboard Marine Corporation: *See*—
Breckenfeld, Paul W.; and Broughton, George L., 4,966,567, Cl. 440-89.000.
Outlaw, Wade S. Adjustable holster for pistol type power tools. 4,966,321, Cl. 224-253.000.
Outokumpu Oy: *See*—
Veistinen, Mauri K., 4,966,668, Cl. 204-192.310.
Overy, Douglas E., to Flint & Walling, Inc. Filtration system having flow control means and tank adapter with selective venting. 4,966,692, Cl. 210-123.000.
Owen, Hartley: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,966,681, Cl. 208-74.000.
Owens-Brockway Glass Container Inc.: *See*—
Ringlien, James A.; and Brower, Dennis L., 4,967,070, Cl. 250-223.00B.
Oy Nokia AB: *See*—
Linden, Antti; Pennanen, Risto; and Stormbom, Lena, 4,966,615, Cl. 65-12.000.
Oy Partek AB: *See*—
Johansson, Lasse; and Astrand, Erik, 4,966,616, Cl. 65-14.000.
Oy Tampella AB: *See*—
Rantala, Mauri; and Syrja, Lasse, 4,966,653, Cl. 162-273.000.
Oy Wartsila AB: *See*—
Liljenfeldt, Gosta; Rosgren, Carl-Erik; Sjoberg, Harry; and Vestergren, Rolf, 4,967,035, Cl. 73-116.000.
Oyarzabal, Hector A. Ball striking practice apparatus. 4,966,367, Cl. 273-26.00E.
Ozawa, Kaoru; and Okawara, Hiroshi, to Sharp Kabushiki Kaisha. Case for circuit board with light-receiving element. 4,967,312, Cl. 361-399.000.
P.H. Glatfelter Company: *See*—
Olson, Robert A.; and Lutz, Lewin R., III, 4,966,651, Cl. 162-28.000.
Pace, Sal A.: *See*—
Avni, Eitan; and Pace, Sal A., 4,966,455, Cl. 356-73.000.
Package Machinery Corporation: *See*—
Farnsworth, Richard; Deines, Donald; and Deines, Alvin, 4,965,984, Cl. 53-444.000.
Paczkowski, Francis M.: *See*—
Rodenberg, Orville C.; Mey, William; Paczkowski, Francis M.; and Leone, Salvatore, 4,967,236, Cl. 355-272.000.
Page, Rocky H.: *See*—
von Kaler, Roland L.; and Page, Rocky H., 4,966,574, Cl. 475-206.000.
Paine, Anthony J., to Xerox Corporation. Processes for squaraine compounds. 4,967,002, Cl. 564-307.000.
Pak, Charles Y. C., to Board of Regents, the University of Texas System. Compositions and methods of treating calcium renal stones. 4,966,776, Cl. 424-677.000.
Paklin, Sergei I.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Palaniappan, Rasappa: *See*—
Cook, Alexander; Dhyanchand, John; Palaniappan, Rasappa; and Schmitt, Dwight, 4,967,334, Cl. 363-34.000.
Palarski, Timothy D. Articulated relaxation chair. 4,966,413, Cl. 297-330.000.
Pall, Erno . Apparatus for separating into its two phases a substance consisting of solid matter suspended in a liquid. 4,966,700, Cl. 210-386.000.
Pang, Peter K. T.; Wang, Lawrence C. H.; Benishin, Christina G.; and Liu, Hsing J. Method for treatment of senile dementia. 4,966,893, Cl. 514-54.000.
Panse, Hubert: *See*—
Obergfell, Rainer; Panse, Hubert; and Schlegel, Wolfgang, 4,967,138, Cl. 323-224.000.
Paoluccio, John A.; and Hoover, Dennis R., to Paoluccio, John A., a part interest. Face protector for splash and spatter protection. 4,965,887, Cl. 2-9.000.
Paris Playground Equipment Inc.: *See*—
Knill, Gary G., 4,966,361, Cl. 272-33.00R.
Park, Kyong; Nassar, Marcos A.; and Sun, Cliff C., to Kavlico Corporation. Fiber optic position sensor. 4,967,071, Cl. 250-227.210.
Park, Sang-Eon: *See*—
Lee, Young K.; Park, Sang-Eon; and Kwon, Young S., 4,966,970, Cl. 544-410.000.

Parker, Clayton E.; and Mostello, Robert A., to BOC Group, Inc., The. Process and apparatus for producing nitrogen from air. 4,966,002, Cl. 62-31.000.
Parker, Merle D., to Hughes Aircraft Company. Flexible scanwheel. 4,966,427, Cl. 350-6.800.
Parkhurst, Anthony D.: *See*—
Doan, Alpha N.; and Parkhurst, Anthony D., 4,967,103, Cl. 346-1.100.
Parrish, Carolyn L. Dieting plate arrangement with movable partitions. 4,966,295, Cl. 220-22.300.
Paruiski, Kenneth A.; Nutting, Thomas C.; and Moore, Leslie G., to Eastman Kodak Company. Color sequential optical offset image sampling system. 4,967,264, Cl. 358-44.000.
Paschal, Richard C., to Distinctively Different, Inc. Dental protective air barrier light apparatus and method. 4,967,320, Cl. 362-96.000.
Patel, Claude: *See*—
Tissot, Patrick; Guy, Jean; and Patel, Claude, 4,965,889, Cl. 4-234.000.
Pathak, Vijay K.; and Green, Christopher T., to Texas Instruments Incorporated. Overvoltage protector. 4,967,256, Cl. 357-38.000.
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., to Du Pont de Nemours, E. I., and Company. Oculoselective beta-blockers as antiglaucoma agents. 4,966,914, Cl. 514-461.000.
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N. Method of and apparatus for producing shaped castings. 4,966,222, Cl. 164-136.000.
Patroni, Joseph J., to Bunge (Australia) Pty. Ltd. Production of proteins in active forms. 4,966,963, Cl. 530-351.000.
Patten, James W.: *See*—
Bentz, Joseph C.; Yonushonis, Thomas M.; Patten, James W.; and Fujimoto, Yuji, 4,966,108, Cl. 123-90.510.
Patterson, Joseph M., to Ultra-Probe. Apparatus including a focused UV light source for non-contact measurement and alteration of electrical properties of conductors. 4,967,152, Cl. 324-158.00R.
Patterson, Peter M.: *See*—
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.
Paulus, Wilfried: *See*—
Klausener, Alexander; Paulus, Wilfried; Schmitt, Hans-Georg; and Brandes, Wilhelm, 4,966,974, Cl. 546-294.000.
Pavelec, John J.: *See*—
Riera, John F.; Bielawski, Billey J., Sr.; and Pavelec, John J., 4,966,061, Cl. 83-862.000.
Pawlak, Wanda; Janiak, Jerzy S.; Turak, Ali A.; and Ignasiak, Boleslaw L., to Electric Power Research Institute, Inc. Process for removing pyritic sulfur from bituminous coals. 4,966,608, Cl. 44-624.000.
Pawlenko, Ivan: *See*—
Billingham, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovsky, Alexander, 4,965,932, Cl. 29-861.000.
Pawlowski, Adam, to Nixdorf Computer AG. Transport device for a multiple layered web material. 4,966,360, Cl. 271-272.000.
Payne, Jewel; Burrascano, Michelle; and Soares, George G., to Mycogen Corporation. Novel coleopteran-active *Bacillus thuringiensis* isolate. 4,966,765, Cl. 424-93.000.
Peacock, Roy N., to MKS Instruments, Inc. Method and circuit for extending the range of a cold cathode discharge vacuum gauge. 4,967,157, Cl. 324-460.000.
Pearce, Andrew: *See*—
Hodge, Stephen R.; and Pearce, Andrew, 4,966,723, Cl. 252-102.000.
Pearcy, Frank H. Buoyant receptacle. 4,966,279, Cl. 206-315.110.
Pedigo, Roy G. Carbon filter tray filling machine and method. 4,966,204, Cl. 141-7.000.
Peelen, Jan G. J.: *See*—
Van Geelen, Andreas N.; Peelen, Jan G. J.; and Venhuizen, Hendrik, 4,966,614, Cl. 65-3.120.
Pelham, Anthony J.; Steiner, Walter R.; and Didden, William S., to Star Technologies, Inc. Fast architecture for graphics processor. 4,967,375, Cl. 364-518.000.
Pell, Edward A. Process for marking guide lines on roofing mat. 4,966,788, Cl. 427-210.000.
Pelrine, Bruce P.: *See*—
Landis, Michael E.; Pelrine, Bruce P.; and Yan, Tsoung Y., 4,967,030, Cl. 585-241.000.
Pena, Juan R. Seal for piston screws in plastics injection and extrusion apparatus. 4,966,539, Cl. 425-208.000.
Peng, Yung-Chow, to Industrial Technology Research Institute, R.O.C. Error correction system for digital to analog converters. 4,967,197, Cl. 341-118.000.
Pennanen, Risto: *See*—
Linden, Antti; Pennanen, Risto; and Stormbom, Lena, 4,966,615, Cl. 65-12.000.
Pentel Kabushiki Kaisha: *See*—
Watanabe, Hitosi; Takagishi, Ikuo; Kosaka, Toshinobu; and Kawabata, Katsuhiko, 4,966,480, Cl. 401-134.000.
Perkin Elmer Corporation, The: *See*—
Young, Lydia J., 4,966,787, Cl. 427-106.000.
Perlik, Helmuth: *See*—
Tomaschek, Heinz A.; and Perlik, Helmuth, 4,966,936, Cl. 524-425.000.
Perloff, David S.: *See*—
Lane, Leslie A.; Lybeck, Lynn V.; Perloff, David S.; and Kumagi, Shoji, 4,967,381, Cl. 364-551.010.
Peroxid-Chemie GmbH: *See*—
Gregor, Carl H., 4,966,706, Cl. 210-609.000.
Perry, Richard W.: *See*—
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.
Perry, William D.; and Winter, Dean C., to Colin Electronics Co., Ltd. Pressurization system for continuous blood pressure monitor transducer. 4,966,156, Cl. 128-672.000.
Pesaro, Mario: *See*—
Bachmann, Jean-Pierre; and Pesaro, Mario, 4,966,172, Cl. 131-276.000.
Peters, Margaret A. Window cornice and method for hanging curtains. 4,966,218, Cl. 160-38.000.
Peterson, Francis A.: *See*—
Bowman, Barry A.; Jeziorski, Stanley J.; Peterson, Francis A.; and Price, Ralph D., 4,966,044, Cl. 74-335.000.
Peterson, Francis C., to Buell Industries, Inc. Fluid conduit coupling. 4,966,398, Cl. 285-319.000.
Peterson, Robert H.: *See*—
Jacobs, Randall W.; and Peterson, Robert H., 4,966,167, Cl. 128-849.000.
Petre, Mark L.: *See*—
Speer, Gregg V.; Ray, Donald L.; and Petre, Mark L., 4,967,044, Cl. 200-4.000.
Petrov, Anatoly M.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Pfeffer, George; and Barber, Donald T., to Wright Line of Canada Ltd. Apparatus for manufacture of reinforced file folders. 4,966,639, Cl. 156-359.000.
Pfeffer, Henry A.; and Hills, William A., to FMC Corporation. Process for manufacturing a soda ash peroxygen carrier. 4,966,762, Cl. 423-415.00P.
Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, to Sotralentz S.A. Transport and/or storage container for liquids and finely divided bulk solids. 4,966,293, Cl. 220-1.500.
Pfiester, James R., to Motorola, Inc. Contact structure and method. 4,966,864, Cl. 437-191.000.
Pfister, Klaus, to Dr. Ing. H.c.F. Porsche Aktiengesellschaft. Motor vehicle having a covering part. 4,966,245, Cl. 180-68.600.
Phala, Heng: *See*—
Ono, Hiroshi; and Phala, Heng, 4,966,982, Cl. 549-274.000.
Pham, Hoa V.: *See*—
Ferchau, Joerg U.; Pham, Hoa V.; and Diaz, Randall J., 4,967,311, Cl. 361-395.000.
Phan, Khue V., to Northern Telecom Limited. Telephone exchange including service feature apparatus. 4,967,408, Cl. 370-62.000.
Pharma Diffusion S.A.: *See*—
Sandhaus, Sami, 4,966,553, Cl. 433-181.000.
Philip Morris Incorporated: *See*—
Keritsis, Gus D.; Nepomuceno, Jose G.; Albertson, Douglas E.; and Haws, Lewis A., 4,966,170, Cl. 131-88.000.
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.
Phillips, Gary B.: *See*—
Lumma, William C., Jr.; and Phillips, Gary B., 4,966,967, Cl. 540-568.000.
Phillips, Nicholas J., to Holtronic Technologies Limited. Manufacture of integrated circuits using holographic techniques. 4,966,428, Cl. 350-3.660.
Phillips Petroleum Company: *See*—
Benham, Elizabeth; McDaniel, Max P.; and Bailey, Fay W., 4,966,951, Cl. 526-106.000.
Bishop, M. D., 4,966,688, Cl. 209-167.000.
Smith, Sanford N., 4,965,920, Cl. 29-112.000.
Phillips, Robert M.: *See*—
Barnett, Larry R.; and Phillips, Robert M., 4,967,162, Cl. 330-43.000.
Philbsen, Kent: *See*—
Ulich, Bobby L.; Keeler, R. Norris; and Philbsen, Kent, 4,967,270, Cl. 358-95.000.
Piednoir, Jacques-Oliver, to VLSI Technology, Inc. Synthetic netlist system and method. 4,967,367, Cl. 364-489.000.
Pierce, Michael L.; and Raffles, Scott J., to Rogers Corporation. Bus bar tab connector. 4,966,563, Cl. 439-729.000.
Pierre Fabre Medicament: *See*—
Leverd, Elie; Bauer, Michel; and Basquin, Serge, 4,966,903, Cl. 514-283.000.
Pioneer Electronic Corporation: *See*—
Moriyama, Yutaka, 4,966,558, Cl. 439-573.000.
Pioneer Photo Albums, Inc.: *See*—
Ruebens, Jason I., 4,965,948, Cl. 40-537.000.
Pisculli, Anthony C.: *See*—
Rupel, Wesley O.; and Pisculli, Anthony C., 4,967,378, Cl. 364-518.000.
Pizza Stick-Ups Limited Partnership: *See*—
Artzer, Richard, 4,966,781, Cl. 426-280.000.

Plant-Tech Horticultural Products, Inc.: *See*—
Lyon, William, 4,965,963, Cl. 47-81.000.
Plotz, Fred: *See*—
Quad, Reiner; Ringelstein, Udo; Plotz, Fred; and Knaup, Gerhard, 4,967,081, Cl. 250-338.100.
Plumly, George W., to Genlyte. Exit sign. 4,967,317, Cl. 362-31.000.
Plummer, Robert G.: *See*—
Miller, Gary L.; and Plummer, Robert G., 4,965,952, Cl. 42-70.010.
Plus Logic, Inc.: *See*—
Kaplinsky, Cecil H., 4,967,107, Cl. 307-465.000.
Pluyter, Pieter B.; and Rutten, Hendrikus J. J., to Stamicarbon, B.V. Polymer films partially provided with stiffened segments, process for the production thereof, and the use thereof. 4,966,803, Cl. 428-192.000.
Pola Chemical Industries Ltd.: *See*—
Tanaka, Yoshinori, 4,966,205, Cl. 141-9.000.
Polaschegg, Hans-Dietrich, to Fresenius AG. Apparatus for dosed continuous simultaneous infusion of a plurality of infusion solutions or medicaments. 4,966,579, Cl. 604-65.000.
Polefka, Thomas G.: *See*—
Gaffab, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,966,777, Cl. 424-52.000.
Pollard, Mark W.: *See*—
Wiens, John P.; Pollard, Mark W.; and Weinberg, John O., 4,967,296, Cl. 360-106.000.
Pollock, Richard A. Anatomical precontoured plating, instruments and methods. 4,966,599, Cl. 606-69.000.
Pollock, Robert W.; and Godlewski, Daniel J., to Siemens Gammasonics, Inc. Identification of scintillation crystals. 4,967,086, Cl. 250-483.100.
Poloni, Alfredo, to Danieli & C. Officine Meccaniche SpA. Very high speed flying shears. 4,966,060, Cl. 83-105.000.
Polovinkin, Leonid V.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Polyakova, Nina P.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Polyplastics Co., Ltd.: *See*—
Takahashi, Katsuhiko, 4,966,935, Cl. 524-412.000.
Pommer, Ernst-Heinrich: *See*—
Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,967,003, Cl. 564-381.000.
Poole, Michael J.: *See*—
Mohan, Navaratnam C.; and Poole, Michael J., 4,967,039, Cl. 174-25.00C.
Post, Stephen R.: *See*—
Butcher, David W.; and Post, Stephen R., 4,966,440, Cl. 350-320.000.
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., to United States of America, Agriculture; and Cornell Research Foundation, Inc. Organic nitriles as insect antifeedants. 4,966,913, Cl. 514-415.000.
Poyda, Frank, to Dynamit Nobel Aktiengesellschaft. Flexible sealing sheet. 4,966,492, Cl. 405-128.000.
Pozefsky, Diane P.: *See*—
Clarke, Kathryn E.; Drake, John E., Jr.; Pozefsky, Diane P.; and Siddall, William E., 4,967,345, Cl. 364-200.000.
PPG Industries, Inc.: *See*—
Beaver, Richard P., 4,966,613, Cl. 65-2.000.
Prescott, William R.: *See*—
Scavezze, Daniel C.; Leeser, Miriam E.; Kammerer, Gerald A.; and Prescott, William R., 4,967,344, Cl. 364-200.000.
President and Fellows of Harvard College: *See*—
Shapiro, Robert; and Vallee, Bert L., 4,966,964, Cl. 536-27.000.
Vallee, Bert L.; and Kurachi, Kotoku, 4,966,849, Cl. 435-199.000.
Prestolite Electric Incorporated: *See*—
Nofzinger, Scott L., 4,967,136, Cl. 320-6.000.
Roberts, William J., 4,967,037, Cl. 123-598.000.
Preston, David M.: *See*—
Janson, David A.; Glinski, Jerome V., Jr.; and Preston, David M., 4,966,246, Cl. 180-140.000.
Price, J. B.: *See*—
Hillman, Joseph T.; Price, J. B.; and Triggs, William M., 4,966,869, Cl. 437-200.000.
Price, Ralph D.: *See*—
Bowman, Barry A.; Jeziorski, Stanley J.; Peterson, Francis A.; and Price, Ralph D., 4,966,044, Cl. 74-335.000.
Priesemuth, Wolfgang. Automotive contact switch arrangement with essentially planar switch springs. 4,967,046, Cl. 200-339.000.
Priest, Gordon W. Flanged axle shaft pulling assist device. 4,965,921, Cl. 29-254.000.
Prime Computer Inc.: *See*—
Higgins, Leo M., III, 4,967,314, Cl. 361-414.000.
Pritchard, Eric K.: *See*—
Mayhew, Christopher A.; and Pritchard, Eric K., 4,966,436, Cl. 350-143.000.
Privat, Richard F. Filter device. 4,966,550, Cl. 433-25.000.
Procter & Gamble Company, The: *See*—
Culshaw, Stephen; and Vos, Eddy, 4,966,724, Cl. 252-158.000.
Hargraves, Peter J.; Dirksing, Robert S.; and Merz, Theodore P., 4,966,780, Cl. 426-118.000.
Muckenfuhs, Delmar R., 4,966,286, Cl. 206-610.000.
Prometrix Corporation: *See*—
Lane, Leslie A.; Lybeck, Lynn V.; Perloff, David S.; and Kumagi, Shoji, 4,967,381, Cl. 364-551.010.
Prunier, Robert; Ruiz, Regis L.; and Ravier, J. Pierre, to Agence Regionale de Developpements Technologiques. Staged tool for boring a hole in an element by axial penetration of the tool. 4,966,023, Cl. 72-41.000.
Puro Corporation of America: *See*—
Horowitz, Carl; Sanduja, Mohan; and Dichter, Michael, deceased, 4,966,872, Cl. 502-7.000.
Purohit, Prakash C.; and Ramdeen, Lal G., to Aveda Corporation. Preservation of cosmetic compositions. 4,966,754, Cl. 424-195.100.
Purser, Kenneth H., to Genus, Inc. Rutherford backscattering surface analyzer with 180-degree deflecting and focusing permanent magnet. 4,967,078, Cl. 250-309.000.
Pusic, Pavo; and Memed, Bozo, to Hitachi Construction Machinery Co., Ltd.; and Hitachi, Ltd. Hydraulic connecting rod. 4,966,109, Cl. 123-197.0AB.
Q. P. Corporation: *See*—
Akagi, Shizuka, 4,965,962, Cl. 47-65.000.
Quad, Reiner; Ringelstein, Udo; Plotz, Fred; and Knaup, Gerhard, to Heimann GmbH. Infrared detector. 4,967,081, Cl. 250-338.100.
Quaker Oats Company, The: *See*—
Eichhorn, Anthony E., 4,966,178, Cl. 135-104.000.
Quantum Chemical Corporation: *See*—
Kiang, Webster W., 4,966,944, Cl. 525-88.000.
Quievy, Didier; and Desjouis, Francis, to Thomson-CSF. Frequency multiplier with programmable order of multiplication. 4,967,160, Cl. 328-16.000.
Quikcoup, Incorporated: *See*—
Hendrickson, Thomas R., 4,966,395, Cl. 285-12.000.
Raab, Harald; Klein, Manfred; Mackert, Nikolaus D.; Hofmann, Karlheinz; and Bittenbring, Gerhard, to Fichtel & Sachs AG. Clutch disc having a hub disc and a sintered steel hub blank and a method of producing the clutch disc. 4,966,269, Cl. 192-70.160.
Racich, James L.: *See*—
Harvey, Andrew C.; Lusignea, Richard W.; and Racich, James L., 4,966,807, Cl. 428-220.000.
Radtke, Dietrich: *See*—
Kauss, Wolfgang; Muncke, Ludwig; Radtke, Dietrich; and Wittich, Kurt, 4,966,066, Cl. 91-516.000.
Rafferty, Michael P.: *See*—
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., 4,966,299, Cl. 220-85.0VR.
Raffles, Scott J.: *See*—
Pierce, Michael L.; and Raffles, Scott J., 4,966,563, Cl. 439-729.000.
Rahn, John P., to Litton Systems, Inc. Fault-tolerant anti-reflective coatings. 4,966,437, Cl. 350-166.000.
Rajappa, Srinivasachari: *See*—
Deshmukh, Abdul R. A. S.; Bhawal, Baburao M.; Shiralkar, Vasudeo P.; and Rajappa, Srinivasachari, 4,967,007, Cl. 564-501.000.
Ramaekers, Donald B. Wheelchair exerciser adapter. 4,966,362, Cl. 272-93.000.
Ramdeen, Lal G.: *See*—
Purohit, Prakash C.; and Ramdeen, Lal G., 4,966,754, Cl. 424-195.100.
Ranco Japan Ltd.: *See*—
Nakatsukasa, Keiichiroh; and Matsumoto, Takao, 4,966,194, Cl. 137-625.430.
Randklev, Ronald M., to Minnesota Mining and Manufacturing Company. Method for storing, mixing and dispensing dental materials. 4,966,465, Cl. 366-111.000.
Raney, Ty A.; and Bervig, Dale R., to Tweco Products. Plasma torch. 4,967,055, Cl. 219-121.500.
Rangarajan, Anand: *See*—
Matlin, Ronald W.; Lenskold, Richard K.; and Rangarajan, Anand, 4,966,631, Cl. 136-244.000.
Rantala, Mauri; and Syrja, Lasse, to Oy Tampella AB. Apparatus for controlling a moving band. 4,966,653, Cl. 162-273.000.
Rasmussen, Michael E.: *See*—
Confer, Keith A.; and Rasmussen, Michael E., 4,965,914, Cl. 24-270.000.
Rasp, Thomas: *See*—
Ankenbauer, Gerhard; Bayer, Oswald; De Boer, Jan; and Rasp, Thomas, 4,966,475, Cl. 384-584.000.
Rathnam, Premila: *See*—
Saxena, Brij B.; Rathnam, Premila; and Singh, Mukul, 4,966,888, Cl. 514-2.000.
Rattan, Dev R.: *See*—
Dyke, Harry J.; and Rattan, Dev R., 4,967,193, Cl. 340-825.030.
Raudat, John L., to Standard-Knapp, Inc. Product divider. 4,966,272, Cl. 198-446.000.
Ravier, J. Pierre: *See*—
Prunier, Robert; Ruiz, Regis L.; and Ravier, J. Pierre, 4,966,023, Cl. 72-41.000.
Raviglione, Cesare; and Rubino, Paolo, to Fiat Auto S.p.A. System for diagnosing anomalies or breakdowns in a plurality of types of electronic control systems installed in motor vehicles. 4,967,143, Cl. 324-73.100.

Ray, Donald L.: *See—*
Speer, Gregg V.; Ray, Donald L.; and Petre, Mark L., 4,967,044, Cl. 200-4.000.

Raychem Corporation: *See—*
Horsma, David A.; Kamath, Hundi P.; and Fang, Shou-Mean, 4,967,176, Cl. 338-22.00R.

Rayman, Gerrard A.; Sugarman, Harvey L.; and Harris, Ivan P., to H. G. Wallace Limited. Device suitable for the administration of a therapeutic substance. 4,966,588, Cl. 604-165.000.

Razzore, Andrew. Basket frame. 4,966,277, Cl. 206-44.00K.

RCA Licensing Corporation: *See—*
Nero, Leroy W., 4,967,121, Cl. 315-411.000.

Ream, Bernard C.: *See—*
Soo, Hwaili; Ream, Bernard C.; and Robson, John H., 4,967,018, Cl. 568-867.000.

Rebhan, Dieter, to Linde Aktiengesellschaft. Process and apparatus for cleaning contaminated soil. 4,966,493, Cl. 405-128.000.

Rebuffat, Carlo; and Rosati, Riccardo. Compression device for the anastomosis of hollow organs. 4,966,602, Cl. 606-154.000.

Rectenwald, Robert M.: *See—*
Colby, Ralph S.; Doumas, William M.; Fouere, Jean-Claude; and Rectenwald, Robert M., 4,967,211, Cl. 346-160.000.

Red Devil, Inc.: *See—*
Johnson, Alan S., 4,966,467, Cl. 366-209.000.

Reed, Emily J.; and Helmstetter, David A., to Olin Corporation. Process for producing low aluminum membrane cell feedbrine. 4,966,764, Cl. 423-499.000.

Reed, Scott T.: *See—*
Ashley, Carol S.; and Reed, Scott T., 4,966,812, Cl. 428-412.000.

Rees, Fenton L., to Sundstrand Corporation. Digital synchronizing circuit for brushless DC motor. 4,967,122, Cl. 318-254.000.

Rees, James D.; Lehman, Richard F.; and Ossman, Kenneth R., to Xerox Corporation. Color correction system for an electrophotographic copying machine. 4,967,265, Cl. 358-75.000.

Reese, Cecil E., to Du Pont de Nemours, E. I., and Company. Texturing polyester yarns. 4,966,740, Cl. 264-103.000.

Regal + Messtechnik GmbH: *See—*
Fischer, Rudolf; and Gartner, Josef, 4,966,188, Cl. 137-489.000.

Regelsberger, Matthias H., to Eastman Kodak Company. Computer disk with security protection. 4,967,184, Cl. 340-572.000.

Regis, Richard R.: *See—*
Relyea, Douglas I.; Regis, Richard R.; and Davis, Robert A., 4,966,912, Cl. 514-397.000.

Reid, James; Roberts, Gary E.; and Frank, Paul D., to Applied Magnetics Corporation. Magnetic head assembly having a transverse guiding surface formed of a mixture of aluminum oxide and titanium carbide. 4,967,300, Cl. 360-122.000.

Reilly, David M.; Nicoli, Anthony M.; Schulze, Richard G.; and Goldenberg, Barbara L., to Honeywell Inc. Pulsed optical source. 4,967,089, Cl. 250-493.100.

Reilly Industries, Inc.: *See—*
Goe, Gerald L.; McGill, Charles K.; and Sherman, Angela R., 4,966,972, Cl. 546-260.000.

Reiss, Robert E., to InterVentional Technologies Inc. Expandable atherectomy cutter with flexibly bowed blades. 4,966,604, Cl. 606-159.000.

Reliance Electric Industrial Company: *See—*
Fossum, Eric R., 4,966,255, Cl. 188-71.800.

Relyea, Douglas I.; Regis, Richard R.; and Davis, Robert A., to Uniroyal Chemical Company, Inc. Fungicidal 3-imino-1,4-oxathiins. 4,966,912, Cl. 514-397.000.

Rempfler, Hermann; Durr, Dieter; and Thummel, Rudolf C., to Ciba-Geigy Corporation. N-phenyl-N-pyrimidin-2-ylureas. 4,966,622, Cl. 71-92.000.

Rems-Werk Christian Foll und Sohne GmbH & Co.: *See—*
Wagner, Rudolf, 4,967,059, Cl. 219-230.000.

Renate Dunsch-Herzberg: *See—*
Herzberg, Wolfgang, 4,966,140, Cl. 128-206.190.

Rendina, Francesco; and Savogin, Lucio, to Bull HN Information Systems Italia S.p.A. Bus driving and decoding circuit. 4,967,390, Cl. 364-900.000.

Renfrew, R. Bruce. Orthopedic cast cover and method of manufacture. 4,966,135, Cl. 128-82.000.

Renishaw plc: *See—*
Stephens, William F. N.; and Thornton, Shane W., 4,966,429, Cl. 350-96.100.

Renner, Alfred: *See—*
Banks, Christopher P.; Irving, Edward; Renner, Alfred; and Smith, Terence J., 4,966,923, Cl. 522-167.000.

Rensselaer Polytechnic Institute: *See—*
Moore, James A.; and Robello, Douglas, 4,966,954, Cl. 528-125.000.

Rentokil Limited: *See—*
Smith, Colin P., 4,966,755, Cl. 422-28.000.

Rentzea, Costin; Himmele, Walter; Buschmann, Ernst; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, to BASF Aktiengesellschaft. Propylamines, and their use as fungicides. 4,967,003, Cl. 564-381.000.

Research Development Corporation of Japan: *See—*
Engel, Alan K., 4,966,743, Cl. 264-298.000.

Research Equipment Corporation: *See—*
Dumas, Jerome E.; Harris, Eric W., Jr.; and MacDougal, John G., 4,967,187, Cl. 340-628.000.

Research Foundation of State University of NY, The: *See—*
Garvey, James F., 4,966,887, Cl. 505-1.000.

Rey, Proserfina C.: *See—*
Keshavan, Madapusi K.; and Rey, Proserfina C., 4,966,627, Cl. 75-240.000.

Reymond, Welles K.; and Sorrentino, Gregory L., to General Data-Comm, Inc. Electrical connector for direct connection to plated through holes in circuit board. 4,966,556, Cl. 439-80.000.

Riaza, John, to Hygenic Corporation, The. Thermoplastic polymer composition comprising trans 1,4-polyisoprene. 4,966,952, Cl. 526-340.200.

Ricardo Group PLC: *See—*
Hundleby, Giles E., 4,966,104, Cl. 123-65.0BA.

Rich, Arthur; Conti, Ralph S.; and Agranoff, Bernard W., to University of Michigan, The. Multi-sample scintillation counter using position-sensitive detector. 4,967,084, Cl. 250-361.00R.

Rich, Edward L., III, to Westinghouse Electric Corp. Multi-layer single substrate microwave transmit/receive module. 4,967,201, Cl. 342-175.000.

Richard Wolf GmbH: *See—*
Baier, Manfred; and Schafer, Roland, 4,966,578, Cl. 604-26.000.

Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., to General Electric Company. Ultrasonic examination of BWR shroud access cover plate retaining welds. 4,966,746, Cl. 376-249.000.

Ricoh Company, Ltd.: *See—*
Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, 4,966,821, Cl. 428-694.000.
Manabe, Yoshiharu; Tomita, Junko; and Shinozaki, Atsushi, 4,967,212, Cl. 346-160.000.
Ohta, Wasaburo; and Nakazawa, Masashi, 4,966,095, Cl. 118-723.000.
Tani, Tatsuo; Watanabe, Mutsuo; and Muramatsu, Shigeru, 4,967,234, Cl. 355-260.000.
Yoshida, Yoshiki; Asada, Kenichirou; and Nagasawa, Kiyoto, 4,967,284, Cl. 358-300.000.

Ricoh Research Institute of General Electronics Co., Ltd.: *See—*
Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, 4,966,821, Cl. 428-694.000.

Riddle, Jack D.; and Nicholas, John D., to MM Systems Corporation. End cap for expansion joint. 4,965,976, Cl. 52-396.000.

Riera, John F.; Bielawski, Billey J., Sr.; and Pavelec, John J. Tube cutting apparatus. 4,966,061, Cl. 83-862.000.

Riley, Donald E., to University of Washington, The Board of Regents of the. Enhanced vector production and expression of recombinant DNA products. 4,966,841, Cl. 435-69.100.

Riley, Kenneth L.: *See—*
Baird, William C., Jr.; Riley, Kenneth L.; and Swan, George A., III, 4,966,880, Cl. 502-242.000.

Rimmer, Daniel P.: *See—*
Gregoli, Armand A.; Olah, Andrew M.; Hamshar, John A.; and Rimmer, Daniel P., 4,966,235, Cl. 166-267.000.

Ringelstein, Udo: *See—*
Quad, Reiner; Ringelstein, Udo; Plotz, Fred; and Knaup, Gerhard, 4,967,081, Cl. 250-338.100.

Ringlien, James A.; and Brower, Dennis L., to Owens-Brockway Glass Container Inc. Indentification of a molded container with its mold of origin. 4,967,070, Cl. 250-223.00B.

Ringold, Gordon M.: *See—*
McCormick, Francis P.; Innis, Michael A.; and Ringold, Gordon M., 4,966,843, Cl. 435-69.510.

Risch, Lothar; Tielert, Reinhard; Mueller, Wolfgang; and Werner, Christoph, to Siemens Aktiengesellschaft. Voltage-stable sub-μm MOS transistor for VLSI circuits. 4,966,859, Cl. 437-29.000.

Risdon Corporation: *See—*
Idec, Eric J.; and Klimeck, Edward F., 4,966,479, Cl. 401-68.000.

Rising, Donald B.; and Zimmerman, Rita, to Millipore Corporation. Gel transfer process and composite. 4,966,667, Cl. 204-182.100.

Riso Kagaku Corporation: *See—*
Hasegawa, Takanori; and Negishi, Hideo, 4,966,073, Cl. 101-120.000.

Rispeter, Siegfried; Muller, Hubert; and Wust, Rainer, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Hydraulically operated double clutch for a motor vehicle. 4,966,270, Cl. 192-87.150.

Ristvedt, Mark E.: *See—*
Ristvedt, Victor G.; and Ristvedt, Mark E., 4,966,570, Cl. 453-6.000.

Ristvedt, Victor G.; and Ristvedt, Mark E. Coin sorting apparatus for sorting coins of selected denominations. 4,966,570, Cl. 453-6.000.

Ritchie, George S.: *See—*
DeLong, Edward A.; and Ritchie, George S., 4,966,650, Cl. 162-14.000.

Ritchie, Henry B.: *See—*
Ciokajlo, John J.; and Ritchie, Henry B., 4,965,994, Cl. 60-39.750.

Rito, Naotake: *See—*
Yamauchi, Shiro; Rito, Naotake; and Takahashi, Nobuyoshi, 4,967,295, Cl. 360-97.020.

Ritsko, Joseph E.: *See—*
Ladd, Judith A.; and Ritsko, Joseph E., 4,966,760, Cl. 423-53.000.

RMS Company: *See—*
Focelle, Dennis M.; and Hanlon, Terrance W., 4,966,603, Cl. 606-158.000.

Robb, Paul N., to Lockheed Missiles & Space Company, Inc. Optimized apochromatic lens systems using inexpensive lens elements. 4,966,448, Cl. 350-418.000.

Robbins, Robin M.: *See—*
Mack, Anthony C.; and Robbins, Robin M., 4,966,294, Cl. 220-266.000.

Robello, Douglas: *See—*
Moore, James A.; and Robello, Douglas, 4,966,954, Cl. 528-125.000.
Robert Bosch GmbH: *See—*
Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krapp, Michael, 4,967,316, Cl. 361-424.000.
Woersinger, Juergen, 4,966,036, Cl. 73-204.220.
Roberts, Gary E.: *See—*
Reid, James; Roberts, Gary E.; and Frank, Paul D., 4,967,300, Cl. 360-122.000.
Roberts, John C.: *See—*
Fair, Martin L.; and Roberts, John C., 4,967,091, Cl. 250-504.00R.
Roberts, William J., to Prestolite Electric Incorporated. Driving circuit for a capacitor discharge ignition system. 4,967,037, Cl. 123-598.000.
Robertson, James. Aerial lift support frame. 4,966,402, Cl. 296-43.000.
Robertson, Michael K.; and Henderson, Robert B., to Nutech Energy Systems Inc. Fluid purification. 4,966,759, Cl. 422-186.000.
Robison, James C. Board game apparatus and method of playing the game. 4,966,372, Cl. 273-252.000.
Robotic Vision Systems, Inc.: *See—*
Stern, Howard K.; and Schmuter, Samson L., 4,967,370, Cl. 364-513.000.
Robson, John H.: *See—*
Soo, Hwaili; Ream, Bernard C.; and Robson, John H., 4,967,018, Cl. 568-867.000.
Rochkind, Simeone; Barr-Nea, Liliane; and Lubart, Rachel. Method for inducing regeneration of injured nerve fibers. 4,966,144, Cl. 128-395.000.
Rockwell-Golde G.m.b.H.: *See—*
Schmidhuber, Karl; Grimm, Rainer; and Bohm, Horst, 4,966,409, Cl. 296-213.000.
Rockwell International Corporation: *See—*
Dyke, Harry J.; and Rattan, Dev R., 4,967,193, Cl. 340-825.030.
Morgan, Peter J.; and Miller, Robert O., 4,967,146, Cl. 324-158.00R.
Rodenberg, Orville C.; Mey, William; Paczkowski, Francis M.; and Leone, Salvatore, to Eastman Kodak Company. Charge retention xeroprinting. 4,967,236, Cl. 355-272.000.
Rodstein, Harvey, to Harden Industries, Inc. Cartridge valve. 4,966,186, Cl. 137-454.500.
Roehrs, Robert E.: *See—*
Gressel, Philip D.; Roehrs, Robert E.; Ubels, John L.; and Edelhauser, Henry F., 4,966,773, Cl. 424-489.000.
Roemer, Edward L.: *See—*
Sanchez, John A.; Roemer, Edward L.; and Stretz, Lawrence A., 4,967,000, Cl. 564-242.000.
Roethlingshoefer, Walter: *See—*
Goebel, Ulrich; Gerstner, Roland; Roethlingshoefer, Walter; Bergfried, Dietrich; and Krapp, Michael, 4,967,316, Cl. 361-424.000.
Roger, Christian: *See—*
Fraignier, Bernard; and Roger, Christian, 4,967,092, Cl. 250-560.000.
Rogers Corporation: *See—*
Pierce, Michael L.; and Raffles, Scott J., 4,966,563, Cl. 439-729.000.
Rohm GmbH: *See—*
Langerbeins, Klaus; and Gruber, Wilhelm, 4,966,877, Cl. 502-209.000.
Rohm, Gunter H.; and Kolmberger, Manfred. Lathe chuck for offecenter workpiece rotation. 4,966,375, Cl. 279-6.000.
Rohrer, Paul: *See—*
Lacca, Eusebio; and Rohrer, Paul, 4,966,799, Cl. 428-95.000.
Rollin, S.A.: *See—*
Laborie, Claude F., 4,966,637, Cl. 156-47.000.
Rolls-Royce plc: *See—*
Belcher, Bryan L.; and Daniels, Michael P., 4,966,231, Cl. 165-166.000.
Rorabaugh, Donald T.: *See—*
LaSalle, Jerry C.; Batra, Ravi; and Rorabaugh, Donald T., 4,966,750, Cl. 420-3.000.
Rosaen, Nils N. Fluid filter retaining device. 4,966,697, Cl. 210-232.000.
Rosati, Riccardo: *See—*
Rebuffat, Carlo; and Rosati, Riccardo, 4,966,602, Cl. 606-154.000.
Rose, Thomas: *See—*
Doemens, Guenter; and Rose, Thomas, 4,967,148, Cl. 324-158.00F.
Doemens, Guenter; Rose, Thomas; Hoffmann, Detlef; and Heisen, Arnold, 4,967,149, Cl. 324-158.00F.
Rosenberger, Edwin D. Animal containment system. 4,966,097, Cl. 119-19.000.
Rosgren, Carl-Erik: *See—*
Liljenfeldt, Gosta; Rosgren, Carl-Erik; Sjoberg, Harry; and Vestergren, Rolf, 4,967,035, Cl. 73-116.000.
Rosi, Ronald; and Sullivan, Valerie C. Diskette holder. 4,966,278, Cl. 206-444.000.
Rotation Dynamics Corporation: *See—*
Zagorski, Gary A., 4,966,555, Cl. 439-28.000.
Rozman, Gregory I.; and Maddali, Vijay K., to Sundstrand Corporation. VSCF start system current estimator. 4,967,132, Cl. 318-798.000.
Rozumek, Olivier: *See—*
Amon, Albert; Bleikolm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, 4,966,628, Cl. 106-30.000.
Rubin, Hector. Holder for glass electric lamp dome. 4,967,331, Cl. 362-433.000.
Rubino, Paolo: *See—*
Raviglione, Cesare; and Rubino, Paolo, 4,967,143, Cl. 324-73.100.
Ruckert, Hans: *See—*
Doenges, Reinhard; Ruckert, Hans; Geissler, Ulrich; and Steppan, Hartmut, 4,966,828, Cl. 430-281.000.
Rudd, Gordon: *See—*
Nomula, Ram R.; Hamersley, Alan B.; and Rudd, Gordon, 4,967,286, Cl. 358-342.000.
Ruder, James L., to Hewlett-Packard Company. Ink jet printer with self-regulating refilling system. 4,967,207, Cl. 346-140.00R.
Rudick, Arthur G.: *See—*
Credle, William S., Jr.; Rudick, Arthur G.; and Jarocki, George J., 4,966,306, Cl. 222-1.000.
Ruebens, Jason I., to Pioneer Photo Albums, Inc. Bi-directional album with memo area. 4,965,948, Cl. 40-537.000.
Ruff, Gerd: *See—*
Hettlage, Eckart; and Ruff, Gerd, 4,967,170, Cl. 333-106.000.
Ruiz, Regis L.: *See—*
Prunier, Robert; Ruiz, Regis L.; and Ravier, J. Pierre, 4,966,023, Cl. 72-41.000.
Rumpf, Horst H.: *See—*
Klos-Hein, Karl; and Rumpf, Horst H., 4,967,036, Cl. 74-54.000.
Rupel, Wesley O.; and Pisculli, Anthony C., to Microsoft Corporation. Method and system for displaying a monochrome bitmap on a color display. 4,967,378, Cl. 364-518.000.
Rupp, Roland: *See—*
Ohm, Andreas; Luchtenberg, Helmut; Bucheler, Manfred; Rupp, Roland; and Feltkamp, Heinrich, 4,966,772, Cl. 424-482.000.
Ruppert, Ingo W., deceased: *See—*
Kruse, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased, 4,966,987, Cl. 558-115.000.
Ruschke, Ricky R., to Filtertek, Inc. Diaphragm-type center flow check valve. 4,966,199, Cl. 137-843.000.
Rush, James B.; Bryan, James S.; Henry, Pearison W.; and Trantham, Richardson J., to Dayco Products, Inc. Method of making shape retention hose construction. 4,966,741, Cl. 264-154.000.
Rush, James B.: *See—*
Bryan, James S.; and Rush, James B., 4,966,202, Cl. 138-172.000.
Russ Bassett Company: *See—*
Higuera, Bernard A.; and Arreola, Miguel A., 4,966,423, Cl. 312-221.000.
Russell, David G.: *See—*
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., 4,966,077, Cl. 102-313.000.
Russell, David W.: *See—*
Brown, Michael S.; Goldstein, Joseph L.; and Russell, David W., 4,966,837, Cl. 435-6.000.
Russell, Della L. Hairpiece for compensation of hair loss. 4,966,173, Cl. 132-54.000.
Russo, Anthony: *See—*
Hall, Jerry B.; and Russo, Anthony, 4,966,685, Cl. 208-390.000.
Rust, Harald: *See—*
Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, 4,967,013, Cl. 568-433.000.
Rustici, Eric S.: *See—*
Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., 4,967,368, Cl. 364-513.000.
Rutschle, Eugen: *See—*
Winkler, Hans-Henning; Rutschle, Eugen; and Haninger, Rudolf, 4,966,505, Cl. 409-134.000.
Rutten, Hendrikus J. J.: *See—*
Pluyter, Pieter B.; and Rutten, Hendrikus J. J., 4,966,803, Cl. 428-192.000.
Ryherd, Eric L.: *See—*
Werner, Ross G.; and Ryherd, Eric L., 4,967,392, Cl. 364-900.000.
Ryozo, Akama: *See—*
Setsuko, Takahashi; Kikuko, Akimoto; Kumiko, Mori; and Ryozo, Akama, 4,966,660, Cl. 204-34.000.
Ryu, Shinei: *See—*
Kawashima, Ikue; Koh, Futoyoshi; Kumano, Masafumi; and Ryu, Shinei, 4,966,821, Cl. 428-694.000.
Saab-Scania Aktiebolag: *See—*
Nordstrom, Orvar, 4,966,403, Cl. 296-76.000.
Saake, James T.: *See—*
Harbolt, Bruce; and Saake, James T., 4,966,736, Cl. 264-11.000.
Sabin, Michael J.: *See—*
Omura, Jimmy K.; Nightingill, Leslie; and Sabin, Michael J., 4,967,389, Cl. 364-900.000.
Sacchi, Fabrizio: *See—*
Betti, Giorgio; Zuffada, Maurizio; Sacchi, Fabrizio; and Gornati, Silvano, 4,967,139, Cl. 323-312.000.
Sadamori, Masaaki; Haze, Kenji; and Katamine, Tosinori, to Mitsubishi Denki Kabushiki Kaisha. Vacuum-film-forming apparatus and method. 4,966,669, Cl. 204-192.120.
Saddler, John N.: *See—*
Yu, Ernest K. C.; Tan, Larry U. L.; and Saddler, John N., 4,966,850, Cl. 435-200.000.
Saeki, Kenshi; Kawasaki, Iwao; Shikaze, Yoshikazu; and Sugaya, Mamoru, to Nihon Parkerizing Co., Ltd. Composition of the surface treatment for metal and the treatment method. 4,966,631, Cl. 148-251.000.
Saigo, Kazuhiko: *See—*
Hasegawa, Masaki; Saigo, Kazuhiko; Yuki, Yoichi; and Tachibana, Kouzou, 4,966,985, Cl. 556-116.000.
Saint-Gobain Vitrage: *See—*
Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, 4,966,618, Cl. 65-106.000.
St. Louis, Paul T., to FM Industries, Inc. Vibratory compactor. 4,966,499, Cl. 405-271.000.

Saito, Itaru: *See—*
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.

Saito, Katsuyuki: *See—*
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Saito, Masatsugu; Ikeda, Chikamasa; Takeoka, Seiei; and Katsutani, Kazuji, to Niles Parts Co., Ltd. Apparatus for controlling a seat for vehicles. 4,967,178, Cl. 340-425.500.

Saito, Mitsunaga: *See—*
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.

Saito, Takayoshi: *See—*
Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, 4,966,500, Cl. 407-34.000.

Saitoh, Koichi: *See—*
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.

Sakaguchi, Iwao: *See—*
Uchida, Akito; and Sakaguchi, Iwao, 4,966,533, Cl. 417-413.000.

Sakaguchi, Masatoshi; and Kitazawa, Yasunori, to Brother Kogyo Kabushiki Kaisha. Thermal head control device. 4,967,205, Cl. 346-76.0PH.

Sakaguchi, Minoru: *See—*
Itou, Syunji; Suzuki, Yoshiro; and Sakaguchi, Minoru, 4,967,307, Cl. 361-335.000.

Sakai, Ikuo: *See—*
Nakamura, Yasuhiro; Sakai, Ikuo; and Kawabuchi, Masami, 4,966,153, Cl. 128-661.090.

Sakai, Mitsugu; Karaki, Koichi; and Sasaki, Yasuo, to Olympus Optical Co., Ltd. Ultrasonic microscope. 4,966,038, Cl. 73-606.000.

Sakai, Norio: *See—*
Hasegawa, Hiroaki; Sakai, Norio; and Osugi, Kazuhiko, 4,966,794, Cl. 428-15.000.

Sakai, Toshio: *See—*
Suzuki, Makoto; Sakai, Toshio; Hattori, Tomoaki; and Takagi, Izumi, 4,967,227, Cl. 355-32.000.

Sakakura, Sigeki, to Fujitsu Limited. Printer having a reversible motor and separate transmissions systems. 4,967,239, Cl. 355-309.000.

Sakamoto, Kazuho: *See—*
Machara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.

Sakamoto, Tetsuya: *See—*
Uchiyama, Takashi; Honma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, 4,967,283, Cl. 358-296.000.

Sakamura, Yoshikazu; and Higuchi, Sumitada, to Kabushiki Kaisha Sakamurakikai Seisakusho. Multi-stage cold forging machine. 4,966,028, Cl. 72-361.000.

Sakanoue, Kei: *See—*
Matsuhita, Tetunori; Yagihara, Morio; and Sakanoue, Kei, 4,966,835, Cl. 430-393.000.

Sakasai, Yutaka: *See—*
Suzuki, Nobuo; Sakasai, Yutaka; and Sato, Hideo, 4,966,825, Cl. 430-137.000.

Sakashita, Kiichiro: *See—*
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Sakashita, Takeshi: *See—*
Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, 4,966,766, Cl. 424-422.000.

Sakiyama, Taiji: *See—*
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.

Sako, Yoichiro: *See—*
Ogawa, Hiroshi; and Sako, Yoichiro, 4,967,403, Cl. 369-44.260.

Sakurai Hidetoshi, to Honda Giken Kogyo Kabushiki Kaisha. Electronic control ignition system for internal combustion engines. 4,966,116, Cl. 123-418.000.

Salbeck, Gerhard: *See—*
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.

Salters, Roelof H. W.: *See—*
Dikken, Jan; and Salters, Roelof H. W., 4,967,103, Cl. 307-296.500.

Sam Techology Inc.: *See—*
Gevins, Alan S.; Durousseau, Donald; and Libove, Joel, 4,967,038, Cl. 128-644.000.

Samata, Shuichi: *See—*
Mikata, Yuuichi; and Samata, Shuichi, 4,966,866, Cl. 437-193.000.

Sample, Jay W. Subsurface dune protection system and method. 4,966,491, Cl. 405-19.000.

Samsung Aerospace Industries, Ltd.: *See—*
Han, Seong-sook, 4,967,213, Cl. 354-173.100.

Sanbayashi, Takeshi, to Kabushiki Kaisha Toshiba. Image formation apparatus for displaying or recording a pre-selected image area of a film. 4,967,235, Cl. 355-271.000.

Sanchez, John A.; Roemer, Edward L.; and Stretz, Lawrence A., to United States of America, Energy. Spherical nitroguanidine process. 4,967,000, Cl. 564-242.000.

Sanders, Edward B.: *See—*
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., 4,966,171, Cl. 131-194.000.

Sanderson, Paul H.; and Serkland, Richard C. Aircraft armament apparatus. 4,966,063, Cl. 89-37.220.

Sandhaus, Sami, to Pharma Diffusion S.A. Set of attachment elements for dental prostheses. 4,966,553, Cl. 433-181.000.

Sanduja, Mohan: *See—*
Horowitz, Carl; Sanduja, Mohan; and Dichter, Michael, deceased, 4,966,872, Cl. 502-7.000.

Sandvik AB: *See—*
Eriksson, Lars-Olov; and Sundstrom, Erik, 4,965,934, Cl. 30-387.000.

Sankaran, Viswanatha. Transesterification of triglycerides. 4,966,876, Cl. 502-171.000.

Sankaranarayanan, Ashok: *See—*
Cheskis, Harvey P.; Watson, W. Gary; and Sankaranarayanan, Ashok, 4,966,224, Cl. 164-429.000.

Sankei Pharmaceutical Company Ltd.: *See—*
Shimizu, Shigeo; and Takano, Hiroyuki, 4,966,900, Cl. 514-206.000.

Sano, Hideaki: *See—*
Ohyabu, Keiji; Watarai, Shinichi; and Sano, Hideaki, 4,966,356, Cl. 271-9.000.

Sanshin Kogyo Kabushiki Kaisha: *See—*
Ito, Kazumasa; and Hirano, Yoshihide, 4,966,115, Cl. 123-418.000.
Mori, Atsushi, 4,966,105, Cl. 123-73.0AD.
Suzuki, Tamotsu; Suzuki, Toyoshi; Iwashita, Takashi; and Sougawa, Masafumi, 4,965,997, Cl. 66-310.000.

Santandrea, Luciano; and Lombardi, Massimo, to Axis S.p.A. Methods for making electric motor parts employing pallet with removable workpiece holder. 4,965,924, Cl. 29-596.000.

Sanyo Electric Co., Ltd.: *See—*
Takuma, Masao; Haruki, Toshinobu; and Kikuchi, Kenichi, 4,967,280, Cl. 358-227.000.

Sari, Hikmet, to U.S. Philips Corporation. Adaptive predistortion circuit. 4,967,164, Cl. 330-149.000.

Sarner, Erik, to AC Biotechnics AB. Anaerobic process for microbiolobical purification of sulphur-containing water. 4,966,704, Cl. 210-603.000.

Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, to Olympus Optical Co., Ltd. Endoscope automatic light control apparatus and endoscope apparatus making use of the same. 4,967,269, Cl. 358-98.000.

Sasaki, Ichiro; Oshima, Junji; and Yamada, Minoru, to Takeda Chemical Industries, Ltd. Polycarbonate resin composition with acrylic impact modifiers. 4,966,942, Cl. 525-67.000.

Sasaki, Masahiko: *See—*
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Sasaki, Masatomi; Morita, Hirotomo; and Matsumoto, Yutaka, to Terumo Kabushiki Kaisha. Hollow fiber membrane fluid processor. 4,966,699, Cl. 210-321.800.

Sasaki, Shigeru: *See—*
Maki, Hiroshi; and Sasaki, Shigeru, 4,967,004, Cl. 564-397.000.

Sasaki, Takanori: *See—*
Mizutori, Youichi; and Sasaki, Takanori, 4,967,288, Cl. 358-425.000.

Sasaki, Touru: *See—*
Oikawa, Ryuetsu; Ikari, Akira; and Sasaki, Touru, 4,966,374, Cl. 277-178.000.

Sasaki, Yasuo: *See—*
Sakai, Mitsugu; Karaki, Koichi; and Sasaki, Yasuo, 4,966,038, Cl. 73-606.000.

Sasaki, Yutaka; and Murakami, Shinichi, to Fuji Xerox Co., Ltd. Roller-driving device for fixing device. 4,967,237, Cl. 355-290.000.

Sashiki, Takashi, to Kabushiki Kaisha Ishida Koki Seisakusho. Distributive supply device for combinatorial weighing apparatus. 4,966,273, Cl. 198-601.000.

Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, to Nippon Petrochemicals Company, Limited. Electrical insulating oil composition and electrical appliances impregnated therewith. 4,967,028, Cl. 585-6.300.

Sato, Haruhito; and Tsuzuki, Masanori, to Idemitsu Kosan Company Limited. Process for the preparation of triethylenediamines. 4,966,969, Cl. 544-352.000.

Sato, Hideo: *See—*
Suzuki, Nobuo; Sakasai, Yutaka; and Sato, Hideo, 4,966,825, Cl. 430-137.000.

Sato, Kenichi, to Sumitomo Electric Industries, Ltd. Method of making a compound cable. 4,966,635, Cl. 148-275.000.

Sato, Masaharu: *See—*
Fukunaga, Yukio; Fukushima, Naoto; Akatsu, Yohsuke; Hano, Sunao; and Sato, Masaharu, 4,967,360, Cl. 364-424.050.

Sato, Masaru: *See—*
Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, 4,966,679, Cl. 208-58.000.

Sato, Shuitsu: *See*—
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.

Sato, Yoshiki; Yamamoto, Yoshitaka; Mito, Yutaka; and Tanabe, Harumasa, to Kabushiki Kaisha Kobe Seiko Sho. Process for separating indole in refined form. 4,966,978, Cl. 548-469.000.

Satoh, Kazuhiro: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.

Satoh, Seiki: *See*—
Yamada, Shinjiro; and Satoh, Seiki, 4,966,266, Cl. 192-39.000.

Satoh, Tamotsu: *See*—
Hashimoto, Seiji; Satoh, Tamotsu; and Sugawa, Shigetoshi, 4,967,067, Cl. 250-208.100.

Satten, Robert; and Held, Helmut. Cleaning fluid dispenser and applicator. 4,966,481, Cl. 401-205.000.

Sauder, David E. Crop feeding system. 4,965,991, Cl. 56-119.000.

Sauerwald, Wilhelm A.; Onsoyran, Anwar; Eerenstein, Lars A. R.; and De Jong, Franciscus G. M., to U.S. Philips Corporation. Electronic module comprising a first substrate element with a functional part, and a second substrate element for testing an interconnection function, socket, substrate element and electronic apparatus therefor. 4,967,142, Cl. 324-73.100.

Saunders Archery Company: *See*—
Saunders, Charles A., 4,965,938, Cl. 33-265.000.

Saunders, Charles A., to Saunders Archery Company. Resistively-mounted, manually-positionable peep sight. 4,965,938, Cl. 33-265.000.

Savchuk, Valentin A.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.

Savogin, Lucio: *See*—
Rendina, Francesco; and Savogin, Lucio, 4,967,390, Cl. 364-900.000.

Sawai, Kenji; and Itoh, Jinichi, to Omron Tateisi Electronics Co.; and Kabushiki Kaisha Sankyo Seiki Seisakusho. Servo motor control device. 4,967,128, Cl. 318-609.000.

Sawasaki, Yoshio: *See*—
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.

Saxena, Brij B.; Rathnam, Premila; and Singh, Mukul, to Cornell Research Foundation, Inc. hCG-hLH receptor and hCG-hLH receptor-hCG complex as antigens, antibodies thereto and contraceptive vaccine. 4,966,888, Cl. 514-2.000.

Scavezze, Daniel C.; Leeser, Miriam E.; Kammerer, Gerald A.; and Prescott, William R., to Codex Corporation. Interconnection network for multiple processors. 4,967,344, Cl. 364-200.000.

Schaebische Huettenwerke GmbH: *See*—
Haerle, Hans A., 4,966,811, Cl. 428-375.000.

Schaeffer, George E.: *See*—
Tatavoosian, Vanacan; and Schaeffer, George E., 4,967,329, Cl. 362-267.000.

Schafer, Helmut, to Desitin Arzneimittel GmbH. Process for the preparation of E-2-propyl-2-pentenoic acid and physiologically compatible salts thereof. 4,966,996, Cl. 562-598.000.

Schafer, Roland: *See*—
Baier, Manfred; and Schafer, Roland, 4,966,578, Cl. 604-26.000.

Schako Metallwarenfabrik Ferdinand Schad KG: *See*—
Muller, Gottfried; and Hipp, Paul, 4,966,069, Cl. 98-40.110.

Scharpf, Lewis G.: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,966,783, Cl. 426-565.000.

Schatz, Wolfgang; and Schneider, Helmut, to Vereinigte Aluminum-Werke AG; and Braun GmbH & Co. Covering frame for windows, doors, and the like. 4,966,819, Cl. 428-603.000.

Schaub, Frederick S.; and Smith, Jesse G., to Cooper Industries, Inc. Combustion system for dual fuel engine. 4,966,103, Cl. 123-276.000.

Scheiwiller, Rolf. Spacers for the construction of walls from superimposed blocks. 4,965,978, Cl. 52-438.000.

Schelhorn, Robert L., to General Electric Company. Metallized ceramic circuit package. 4,967,315, Cl. 361-424.000.

Scheper, Halbe W. Vehicle wheel suspension clearance detector. 4,966,376, Cl. 280-1.000.

Schering AG: *See*—
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,966,945, Cl. 525-113.000.

Schering Aktiengesellschaft: *See*—
Ehrich, Hans-Jurgen; and Mahlkow, Hartmut, 4,966,786, Cl. 427-97.000.

Scherowsky, Gunter; and Gunaratne, Manel, to Hoechst Aktiengesellschaft. Chiral reaction products produced from mesogenic molecular structural elements and bifunctionally reactive tartaric acid derivatives, and their use as dopants in liquid crystal phases. 4,966,726, Cl. 252-299.600.

Schertler, Armin: *See*—
Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, 4,966,349, Cl. 266-276.000.

Schettler, Helmut: *See*—
Ludwig, Thomas; Schettler, Helmut; Wagner, Otto M.; and Zuhlke, Rainer, 4,967,104, Cl. 307-443.000.

Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, to Voest-Alpine Industrienlagenbau. Supporting arrangement for casting ladles provided in a continuous casting plant. 4,966,349, Cl. 266-276.000.

Schiel, Lothar; Jakobi, Ralf; and Bauer, Juergen, to Alfred Teves GmbH. Automotive vehicle braking unit. 4,966,420, Cl. 303-114.000.

Schiller, Frank J.: *See*—
Billingham, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovsky, Alexander, 4,965,932, Cl. 29-861.000.

Schindel, Wesley G.: *See*—
Gumprecht, William H.; Schindel, Wesley G.; and Felix, Vinci M., 4,967,024, Cl. 570-168.000.

Schindler, Ursula: *See*—
Zoller, Gerhard; Beyerle, Rudi; and Schindler, Ursula, 4,966,901, Cl. 514-211.000.

Schinski, William L.; and Denisevich, Peter, Jr., to Chevron Research Company. Process for preparing acetonitrile 3-trifluoromethyl benzene. 4,966,988, Cl. 558-342.000.

Schipper, Paul H.: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,966,681, Cl. 208-74.000.

Schlecht, Martin F.: *See*—
Baliga, Bantval J.; and Schlecht, Martin F., 4,967,243, Cl. 357-23.400.

Schlegel, Wolfgang: *See*—
Obergfell, Rainer; Panse, Hubert; and Schlegel, Wolfgang, 4,967,138, Cl. 323-224.000.

Schleimann-Jensen, Lars J. Projectile steering apparatus and method. 4,966,078, Cl. 102-384.000.

Schlitt, Steven C., to GTE Products Corporation. Cosmetic tanning lamp and system having adjustable UVB proportion. 4,967,090, Cl. 250-504.00R.

Schlosser, Erich H.: *See*—
Stephen, James C.; Schlosser, Erich H.; and Leja, Andrzej, 4,966,125, Cl. 126-25.00R.

Schlumberger Technology Corporation: *See*—
Marcellus, Emerson C., 4,967,166, Cl. 331-116.00R.

Schlumpberger, Michael X.: *See*—
Swanson, David E.; and Schlumpberger, Michael X., 4,966,237, Cl. 166-292.000.

Schmid, Karl; Meffert, Alfred; Friedrich, Klaus; Langen, Michael; and Herrmann, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Alcohol ethoxylates of reduced EO content or residual PO content. 4,967,017, Cl. 568-621.000.

Schmidhuber, Karl; Grimm, Rainer; and Bohm, Horst, to Rockwell-Golde G.m.b.H. Shield for covering the gap between the sliding cover and the roof frame of a sliding roof or sliding lifting roof of a motor vehicle. 4,966,409, Cl. 296-213.000.

Schmidt, Kenneth C.; and Knak, James L., to Kand M Electronics. Channel electron multiplier phototube. 4,967,115, Cl. 313-103.0CM.

Schmidt, Lynn A.: *See*—
Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., 4,967,412, Cl. 371-20.100.

Schmitt, Dwight: *See*—
Cook, Alexander; Dhyanchand, John; Palaniappan, Rasappa; and Schmitt, Dwight, 4,967,334, Cl. 363-34.000.

Schmitt, Hans-Georg: *See*—
Klausener, Alexander; Paulus, Wilfried; Schmitt, Hans-Georg; and Brandes, Wilhelm, 4,966,974, Cl. 546-294.000.

Schmitt, Michael: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

Schmitz, Stephen R.: *See*—
Sykes, Philip K.; and Schmitz, Stephen R., 4,966,283, Cl. 206-387.000.

Schmuter, Samson L.: *See*—
Stern, Howard K.; and Schmuter, Samson L., 4,967,370, Cl. 364-513.000.

Schneider, Harry E., to Lindberg Corp. Method and apparatus for monitoring atmosphere in furnaces. 4,966,348, Cl. 266-79.000.

Schneider, Helmut: *See*—
Schatz, Wolfgang; and Schneider, Helmut, 4,966,819, Cl. 428-603.000.

Schneider, Walter, to W. Schneider & Co., AG Metallwarenfabrik. Cabinet construction. 4,966,424, Cl. 312-265.600.

Schnoes, Heinrich K.: *See*—
DeLuca, Hector F.; Kutner, Andrzej; and Schnoes, Heinrich K., 4,966,965, Cl. 536-27.000.

Schomann, Klaus D.: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.

Schonenbrucher, Paul-Erich: *See*—
Wiese, Helmut; and Schonenbrucher, Paul-Erich, 4,966,265, Cl. 192-35.000.

Schotanus, Joel M.: *See*—
Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., 4,965,933, Cl. 29-882.000.

Schouster, Joseph W.: *See*—
Clark, Jack G., Jr.; and Schouster, Joseph W., 4,966,644, Cl. 156-247.000.

Schouwenaars, Hendrikus J.: *See*—
Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., 4,967,140, Cl. 323-315.000.
Schraag, Martin: *See*—
Gang, Achim; Schraag, Martin; and Blendinger, Gunter, 4,966,152, Cl. 128-661.070.
Schrader Automotive, Inc.: *See*—
Bock, Ditmar H.; and Grace, John M., 4,966,034, Cl. 73-146.500.
Schram, Henk. Inflatable body with a valve and a packaging with such a body. 4,966,185, Cl. 137-223.000.
Schreiber, Kurt: *See*—
Baumann, Heinz; Mutter, Heinz; Schreiber, Kurt; and Thurig, Peter, 4,966,206, Cl. 141-83.000.
Schroeder, Carl H., legal representative: *See*—
Kruse, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased, 4,966,987, Cl. 558-115.000.
Schrott, Wolfgang: *See*—
Brosius, Sibylle; Barzynski, Helmut; Feuerherd, Karl-Heinz; Schrott, Wolfgang; Albert, Bernhard; Acker, Michael; Schomann, Klaus D.; Kuppelmaier, Harald; and Schmitt, Michael, 4,966,798, Cl. 428-64.000.
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, to Hoechst Aktiengesellschaft. Heterocyclic neophane analogs, processes for their preparation and their use as pest-combating agents. 4,966,902, Cl. 514-277.000.
Schuhmacher, Chris A.; and Aleshire, Rex A., to NCR Corporation. Optical scanner producing multiple scan patterns. 4,967,076, Cl. 250-236.000.
Schultz, Warren J.: *See*—
Davies, Robert B.; Schultz, Warren J.; and Stipanuk, James J., 4,967,336, Cl. 363-132.000.
Schulz, Dieter; Wrede, Ulrich; and Mackel, Wilfried, to Westfalia Separator AG. Continuously operating centrifuge drum. 4,966,576, Cl. 494-56.000.
Schulz, Winfried; Kirchhoffer, Johann; and Graef, Kurt, to Ford Motor Company. Control valve for reducing harshness of engagement of an automatic transmission clutch. 4,966,050, Cl. 74-867.000.
Schulze, Richard G.: *See*—
Reilly, David M.; Nicoli, Anthony M.; Schulze, Richard G.; and Goldenberg, Barbara L., 4,967,089, Cl. 250-493.100.
Schumacher, John C.; McMenamin, Joseph C.; Anderson Lawrence B.; Cowles, Harold R.; and Lord, Stephen M., to Custom Engineered Materials Inc. Removal and destruction of volatile organic compounds from gas streams. 4,966,611, Cl. 55-20.000.
Schumann, Axel: *See*—
Kruse, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased, 4,966,987, Cl. 558-115.000.
Schupak, Grigory B.: *See*—
Paton, Boris E.; Medovar, Boris I.; Orlovsky, Jury V.; Lupan, Vitaly V.; Maidannik, Vladimir Y.; Schupak, Grigory B.; Chernyavsky, Jury Y.; Bogachenko, Alexei G.; and Kozhushko, Alexandr N., 4,966,222, Cl. 164-136.000.
Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., to Eaton Corporation. Automatic steering apparatus for crop vehicle. 4,967,362, Cl. 364-424.070.
Schwartz, Larry A.; and Lesser, Bertram, to Omni Products International, Inc. Lawn furniture and method of making same. 4,966,414, Cl. 297-445.000.
Schwartz, Larry A.; and Lesser, Bertram, to Omni Products International, Inc. Structural member and lawn furniture constructed therefrom. 4,966,415, Cl. 297-445.000.
Schwartz, Martin T.: *See*—
Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., 4,965,933, Cl. 29-882.000.
Schwarz, Donald P.: *See*—
Mraz, James E.; Schwartz, Martin T.; Kemp, James M.; Schotanus, Joel M.; and Schwarz, Donald P., 4,965,933, Cl. 29-882.000.
Schwarz, Willi. Means for erecting a wall of wall blocks, preferably of glass. 4,965,975, Cl. 52-308.000.
Scott, Howard F.: *See*—
Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., 4,967,199, Cl. 342-22.000.
Seagate Technology, Inc.: *See*—
Wiens, John P.; Pollard, Mark W.; and Weinberg, John O., 4,967,296, Cl. 360-106.000.
Seckora, Michael C. Serial-to-parallel analog CCD GaAs device. 4,967,198, Cl. 341-150.000.
Sedelnikov, Anatoly I.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei L, 4,966,756, Cl. 422-37.000.
Sedum Corporation: *See*—
Fawcett, Sherwood L., 4,966,228, Cl. 165-4.000.
Seeger-Orbis GmbH: *See*—
Komlos, Karl; and Mihalcea, Radu, 4,965,926, Cl. 29-705.000.
Seiko Epson Corporation: *See*—
Ono, Yoichi; Fujii, Kunio; Hinata, Shoji; and Wakabayashi, Satoshi, 4,966,442, Cl. 350-339.00R.
Seislith Development, Inc.: *See*—
Barney, William M., 4,967,401, Cl. 367-46.000.
Seitz, Thomas, to LGZ Landis & Gyr Zug AG. Thin film high permeability magnetic core flux gate device for measuring a weak magnetic field. 4,967,156, Cl. 324-249.000.
Seki, Yasunari; Koike, Yuzuru; Tachibana, Yosuke; and Tsukimura, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Intake air flow control apparatus of internal-combustion engine. 4,966,110, Cl. 123-327.000.
Sekido, Hiroshi; and Hioki, Toshimichi, to Okamoto Industries,Inc. Air cushion for chair and chair utilizing the air cushion. 4,965,899, Cl. 5-453.000.
Seko, Yasutoshi, to Nissan Motor Co., Ltd. Headlight apparatus for automotive vehicle. 4,967,319, Cl. 362-61.000.
Selle San Marco Di Girardi Comm. Luigi S.p.A.: *See*—
Solini, Fabio, 4,967,179, Cl. 340-432.000.
Selover, Jay C.: *See*—
Kissell, Charles L.; Selover, Jay C.; and Ingle, David M., 4,966,791, Cl. 427-389.900.
Sem-Torq, Inc.: *See*—
Seme, Joseph P., Jr.; Balog, Charles R.; and Janashak, Robert, 4,966,504, Cl. 409-140.000.
Seme, Joseph P., Jr.; Balog, Charles R.; and Janashak, Robert, to Sem-Torq, Inc. Electrode tip dresser and holder assembly. 4,966,504, Cl. 409-140.000.
Senet, Jean-Pierre: *See*—
Chodorge, Jeannine; Senet, Jean-Pierre; and Wooden, Gary, 4,966,995, Cl. 562-861.000.
Sengupta, Sisir, to Boston University, Trustees of. Reverse analogue of actinomycin D. 4,966,962, Cl. 530-317.000.
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., to United Technologies Corporation. Leading edge heat pipe arrangement. 4,966,229, Cl. 165-41.000.
Sentman, Gerald K. Thread pitch cylinder gage. 4,965,936, Cl. 33-199.00R.
Septier, Helene: *See*—
Carmona, Francois; Maire, Jacques; Septier, Helene; Canet, Roland; and Delhaes, Pierre, 4,966,729, Cl. 252-511.000.
Serkland, Richard C.: *See*—
Sanderson, Paul H.; and Serkland, Richard C., 4,966,063, Cl. 89-37.220.
Serrano, Mark A.; Houghton, Kenneth S.; Lanzillotti, Harry V.; Sanders, Edward B.; Lilly, A. Clifton, Jr.; Hayward, Charles R.; Hearn, John R.; and Losee, D. Bruce, Jr., to Philip Morris Incorporated. Smoking article. 4,966,171, Cl. 131-194.000.
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, to Sumitomo Metal Industries, Ltd.; and Mitsubishi Jukogyo Kabushiki Kaisha. Method for molten salt electroplating of steel. 4,966,659, Cl. 204-28.000.
Seto, Toru: *See*—
Iida, Kozo; Seto, Toru; and Obayashi, Yoshiaki, 4,966,873, Cl. 502-84.000.
Setsuko, Takahashi; Kikuko, Akimoto; Kumiko, Mori; and Ryozo, Akama, to Nisshin Steel Co., Ltd. Process for electrodeposition of aluminum on metal sheet. 4,966,660, Cl. 204-34.000.
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., to Bigge Crane & Rigging Co. Method for dismantling a natural gas holder. 4,965,922, Cl. 29-426.400.
SGS-Thomson Microelectrics s.r.l.: *See*—
Crotti, Pier L.; and Iazzi, Nadia, 4,966,867, Cl. 437-195.000.
SGS-Thomson Microelectronics S.r.l.: *See*—
Betti, Giorgio; Zuffada, Maurizio; Sacchi, Fabrizio; and Gornati, Silvano, 4,967,139, Cl. 323-312.000.
Shahid, Muhammed A., to AT&T Bell Laboratories. Crystal growth method and apparatus. 4,966,645, Cl. 156-616.400.
Shamblee, Dwight A.: *See*—
Lo, Young S.; Shamblee, Dwight A.; Causey, David H.; and Mays, Richard P., 4,966,979, Cl. 548-950.000.
Shannon, David F.: *See*—
Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., 4,967,368, Cl. 364-513.000.
Shanzer, Abraham; Libman, Jacqueline; and Lifson, Shneior, to Yeda Research and Development Co., Ltd. Trishydroxamic acids. 4,966,997, Cl. 562-623.000.
Shapiro, Robert; and Vallee, Bert L., to President and Fellows of Harvard College. Inhibitors of angiogenin. 4,966,964, Cl. 536-27.000.
Sharp Kabushiki Kaisha: *See*—
Akamatsu, Norio; and Tsukao, Toshiya, 4,967,105, Cl. 307-448.000.
Kaneshiro, Tetuya; and Tanabe, Takeshi, 4,967,049, Cl. 219-10.55B.
Nakamura, Tsuneo; Imae, Kazuyoshi; Deguchi, Haruhiko; and Kira, Tohru, 4,966,648, Cl. 156-643.000.
Narumiya, Masao; and Kiyohara, Toshimi, 4,967,409, Cl. 370-085.600.
Nomura, Akihiro; and Kiyohara, Toshimi, 4,967,374, Cl. 364-518.000.
Ozawa, Kaoru; and Okawara, Hiroshi, 4,967,312, Cl. 361-399.000.
Suzuki, Akira; and Furukawa, Katsuki, 4,966,860, Cl. 437-31.000.
Suzuki, Takashi, 4,966,157, Cl. 128-696.000.
Tanaka, Koichi; Mikami, Akiyoshi; and Taniguchi, Kouji, 4,967,251, Cl. 357-30.000.
Shell Oil Company: *See*—
Kemp, Richard A., 4,967,016, Cl. 568-618.000.

Shemarovsky, Alexander: *See*—
Billingham, Kenneth H.; Franks, James E.; Pawlenko, Ivan; Schiller, Frank J.; and Shemarovsky, Alexander, 4,965,932, Cl. 29-861.000.

Shepherd, Glen C.; Warriner, Dirk; and Starks, Charles F., to Texas Instruments Incorporated. System for enhancing current carrying capacity of printed wiring board. 4,967,042, Cl. 174-250.000.

Sherex Chemical Company, Inc.: *See*—
Friedli, Floyd E.; and Gilbert, Robert M., 4,967,008, Cl. 564-512.000.

Sherikar, Sanjay V., to Tiernay Turbines, Incorporated. Two-row pipe diffusers with boundary layer control. 4,966,523, Cl. 415-208.400.

Sherman, Angela R.: *See*—
Goe, Gerald L.; McGill, Charles K.; and Sherman, Angela R., 4,966,972, Cl. 546-260.000.

Sherman, Deborah M.: *See*—
Michelucci, John J.; Sherman, Deborah M.; and DeNeale, Richard J., 4,966,768, Cl. 424-468.000.

Sherman, Jimmy L. Board games of emotional expression. 4,966,371, Cl. 273-243.000.

Sherman, Marvin, to Wilson Creek Placer Ltd. Fine metal recovery apparatus. 4,966,686, Cl. 209-255.000.

Sherriff, Robert C.: *See*—
Bannochie, John G.; and Sherriff, Robert C., 4,966,674, Cl. 204-290.00R.

Shewey, Charles E.: *See*—
Linke, Thomas A.; Livingston, Troy W.; Wanha, Christopher D.; and Shewey, Charles E., 4,966,538, Cl. 425-144.000.

Shiau, Shoei-Shuh. Variable focusing flashlight. 4,967,325, Cl. 362-188.000.

Shibasaki, Nobuo; Tanaka, Toshio; Nagayama, Yoshiharu; and Yasunari, Kenjiro, to Hitachi, Ltd. Semiconductor integrated circuit device. 4,967,387, Cl. 364-580.000.

Shibata, Akira: *See*—
Ishii, Kenjiro; Fukumoto, Fumio; Nagata, Koichi; and Shibata, Akira, 4,967,228, Cl. 355-40.000.

Shibata, Shinzi: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

Shibata, Tohru: *See*—
Namikoshi, Hajime; Shibata, Tohru; and Okamoto, Ichiro, 4,966,694, Cl. 210-198.200.

Shibuya, Atsuyoshi: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Shields, M. Bruce; and Erickson, Phillip J., to Ocular Instruments, Inc.; and Duke University. Contact lens for laser surgery. 4,966,452, Cl. 351-219.000.

Shields, Robert L. Hexagon turf plugger. 4,966,238, Cl. 172-19.000.

Shifrin, Gordon A., to Hughes Aircraft Company. Spectral analyzer and direction indicator and aircraft landing system application. 4,966,456, Cl. 356-73.000.

Shigesada, Masaaki, to Nissan Motor Co., Ltd. Method of treating inner mold surface. 4,966,832, Cl. 430-323.000.

Shikaze, Yoshikazu: *See*—
Saeki, Kenshi; Kawasaki, Iwao; Shikaze, Yoshikazu; and Sugaya, Mamoru, 4,966,634, Cl. 148-251.000.

Shikinami, Yasuo; Tsuta, Kaoru; Taniguchi, Masahiko; and Boutani, Hidekazu, to Takiron Co., Ltd. Liquid segment polyurethane gel and couplers for ultrasonic diagnostic probe comprising the same. 4,966,953, Cl. 528-60.000.

Shima, Yoshisuke, to Kyokujitsu Company, Ltd. Continuous multistage thermal processing apparatus, freezing control method for use by the apparatus, and apparatus for preparing a recording medium for the control method. 4,966,003, Cl. 62-63.000.

Shimada, Katsuhiko: *See*—
Matsumoto, Tsuruyoshi; Yamamoto, Takashi; Sugimori, Teruhiko; and Shimada, Katsuhiko, 4,966,435, Cl. 350-96.340.

Shimaohgi, Toshio: *See*—
Katsuma, Takashi; Mori, Hideo; Shimaohgi, Toshio; and Umezu, Naoaki, 4,967,120, Cl. 315-382.000.

Shimasaki, Hajime: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Shimasaki, Yuuji: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.

Shimaya, Hiroshi: *See*—
Kaneko, Kiyotaka; Miyake, Izumi; Nakane, Yoshio; and Shimaya, Hiroshi, 4,967,294, Cl. 360-78.130.

Shimizu, Atuo: *See*—
Mieno, Fumitake; Kurita, Kazuyuki; Nakamura, Shinji; and Shimizu, Atuo, 4,966,861, Cl. 437-99.000.

Shimizu, Isoo; Matsumura, Yasuo; and Iwamoto, Kouichi, to Nippon Petrochemicals Co., Ltd. Method for oxidizing unsaturated aromatic compounds. 4,967,009, Cl. 568-309.000.

Shimizu, Keisuke: *See*—
Yamashita, Yuji; Kobayashi, Koji; Shimizu, Keisuke; and Makekawa, Koji, 4,966,301, Cl. 220-270.000.

Shimizu, Shigehisa: *See*—
Suzuki, Chiaki; and Shimizu, Shigehisa, 4,965,931, Cl. 29-783.000.

Shimizu, Shigeo; and Takano, Hiroyuki, to Sankei Pharmaceutical Company Ltd.; and Nippon Pharmaceutical Development Institute Co., Ltd. Cephalosporin β-lactam compound and medicinal composition. 4,966,900, Cl. 514-206.000.

Shimizu, Toshiyuki, to NEC Corporation. Structure of semiconductor memory cell with trench-type capacitor. 4,967,248, Cl. 357-23.600.

Shimoenura, Hiroshi: *See*—
Iwasaki, Takashi; and Shimomura, Hiroshi, 4,966,385, Cl. 280-698.000.

Shimoenura, Setsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Method for adjusting idling RPM of engine. 4,966,112, Cl. 123-339.000.

Shimoyashiro, Sadao: *See*—
Maeda, Kazuhiko; and Shimoyashiro, Sadao, 4,967,386, Cl. 364-578.000.

Shimozato, Yoshio: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Shimura, Kazuo, to Fuji Photo Film Co., Ltd. Method of recognizing irradiation field. 4,967,079, Cl. 250-327.200.

Shimura, Teruyuki, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 4,967,254, Cl. 357-34.000.

Shin-Etsu Polymer Co., Ltd.: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 4,966,804, Cl. 428-203.000.

Shinagawa, Yukio, to Fuji Photo Film Co., Ltd. Diffusion transfer photographic film units. 4,966,826, Cl. 430-262.000.

Shingaki, Kouichi: *See*—
Kitano, Hiroshisa; Saito, Itaru; Matsubara, Ken; Shingaki, Kouichi; Masuda, Tomohiko; and Enoguchi, Yuji, 4,967,240, Cl. 355-318.000.

Shinjo, Goro: *See*—
Aki, Seietsu; and Shinjo, Goro, 4,966,796, Cl. 428-34.300.

Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, to Central Glass Company, Limited. Vehicle window glass antenna suited to reception of FM radio and TV broadcasting. 4,967,202, Cl. 343-713.000.

Shinoki, Hiroshi; and Ono, Mitsunori, to Fuji Photo Film Co. Ltd. Method of producing dyed polysaccharide:amino or imino starch derivative with reactive dye. 4,966,607, Cl. 8-549.000.

Shinozaki, Atsushi: *See*—
Manabe, Yoshiharu; Tomita, Junko; and Shinozaki, Atsushi, 4,967,212, Cl. 346-160.000.

Shiokawa, Yoshihiro: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.

Shipley, Robert T. Hospital signaling and communications system. 4,967,195, Cl. 340-825.520.

Shiraki, Kazuyoshi; Ishiguro, Shiro; and Matsubara, Akinori, to Casio Computer Co., Ltd. Electronic musical instrument. 4,966,052, Cl. 84-715.000.

Shiralkar, Vasudeo P.: *See*—
Deshmukh, Abdul R. A. S.; Bhawal, Baburao M.; Shiralkar, Vasudeo P.; and Rajappa, Srinivasachari, 4,967,007, Cl. 564-501.000.

Shoukry, Ehsan I.: *See*—
Baird, William C., Jr.; and Shoukry, Ehsan I., 4,966,682, Cl. 208-139.000.

Show, Edgar D., to Driscoll Strawberry Associates, Inc. Predator mite and beneficial insect field applicator. 4,966,329, Cl. 239-650.000.

Showa Denko Kabushiki Kaisha: *See*—
Tamamura, Hideo, 4,966,661, Cl. 204-64.00R.
Tamamura, Hideo, 4,966,662, Cl. 204-71.000.
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,966,809, Cl. 428-323.000.

Shrodes, Robert, Jr.: *See*—
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., 4,966,299, Cl. 220-85.0VR.

Shuji, Ono; Kimura, Tsutomu; and Takasaki, Yoshimi, to Fuji Photo Film Co., Ltd. Light scanning device having a synchronizing grid with a phase-detected starting point area. 4,967,073, Cl. 250-235.000.

Shustov, Valentin N. Earthquake shelter with bed support and canopy. 4,965,895, Cl. 5-414.000.

Sicpa Holding SA: *See*—
Amon, Albert; Bleikolm, Anton; Degott, Pierre; Rozumek, Olivier; and Bretler, Haim, 4,966,628, Cl. 106-30.000.

Siddall, William E.: *See*—
Clarke, Kathryn E.; Drake, John E., Jr.; Pozefsky, Diane P.; and Siddall, William E., 4,967,345, Cl. 364-200.000.

Sieber Verpackungstechnik GmbH & Co. KG: *See*—
Muller, Roland; Gries, Manfred; and Klein, Roland, 4,965,983, Cl. 53-435.000.

Siefers, John E.: *See*—
Cain, Christopher B.; McAuliffe, Robert E.; Schmidt, Lynn A.; May, Elaine L.; and Siefers, John E., 4,967,412, Cl. 371-20.100.

Siegel, Hardo: *See*—
Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, 4,967,013, Cl. 568-433.000.

Siegemund, Gunter: *See*—
Kruse, Alfred; Siegemund, Gunter; Schumann, Axel; and Ruppert, Ingo W., deceased, 4,966,987, Cl. 558-115.000.
Siegmund, Arthur J.; and Ladouceur, Henry E., to Siegmund, Inc. Method for single side spray processing of printed circuit boards. 4,966,647, Cl. 156-640.000.
Siegmund, Inc.: *See*—
Siegmund, Arthur J.; and Ladouceur, Henry E., 4,966,647, Cl. 156-640.000.
Siemens Aktiengesellschaft: *See*—
Althaus, Hans-Ludwig; and Greil, Andreas, 4,966,439, Cl. 350-253.000.
Brust, Hans D., 4,967,150, Cl. 324-158.00R.
Buerk, Hermann; Wagner, Thomas; and Steinhauser, Michael, 4,966,664, Cl. 204-146.000.
Doemens, Guenter; and Rose, Thomas, 4,967,148, Cl. 324-158.00F.
Doemens, Guenter; Rose, Thomas; Hoffmann, Detlef; and Heisen, Arnold, 4,967,149, Cl. 324-158.00F.
Droegemueller, Karsten; Mayerhofer, Franz; Klement, Ekkehard; and Deserno, Ulrich, 4,966,444, Cl. 350-376.000.
Erhardt, Werner, 4,967,310, Cl. 361-275.000.
Frinzel, Udo, 4,966,122, Cl. 123-585.000.
Obergfell, Rainer; Panse, Hubert; and Schlegel, Wolfgang, 4,967,138, Cl. 323-224.000.
Risch, Lothar; Tielert, Reinhard; Mueller, Wolfgang; and Werner, Christoph, 4,966,859, Cl. 437-29.000.
Siemens Gammasonics, Inc.: *See*—
Pollock, Robert W.; and Godlewski, Daniel J., 4,967,086, Cl. 250-483.100.
Sigwalt, Paul: *See*—
Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, 4,966,293, Cl. 220-1.500.
Siliconix incorporated: *See*—
Cogan, Adrian I.; and Thornton, Neill R., 4,967,245, Cl. 357-23.400.
Simon, Allen H.: *See*—
Sprague, David L.; and Simon, Allen H., 4,967,196, Cl. 341-67.000.
Singer, Heinrich; Stechele, Werner; and Bernhein, Michael, to Ciba-Geigy Corporation. Aqueous dispersions for simultaneously providing fibrous materials with a softening and hydrophilic finish, a process for their production and their use. 4,966,725, Cl. 252-8.800.
Singh, Mukul: *See*—
Saxena, Brij B.; Rathnam, Premila; and Singh, Mukul, 4,966,888, Cl. 514-2.000.
Sinisi, David B.: *See*—
Barkus, Lee A.; Kandybowski, Steven J.; and Sinisi, David B., 4,966,557, Cl. 439-246.000.
Sinkoff, Howard L. Connecting devices for grids. 4,966,487, Cl. 403-24.000.
Sipos, Peter A.; and Besso, Erica M., to Du Pont Canada Inc. High temperature release sheet for printed circuit boards. 4,966,960, Cl. 528-335.000.
Sit, James K.; and Miller, William C. Injection site platform. 4,966,582, Cl. 604-86.000.
Sjoberg, Harry: *See*—
Liljenfeldt, Gosta; Rosgren, Carl-Erik; Sjoberg, Harry; and Vestergren, Rolf, 4,967,035, Cl. 73-116.000.
Sjostrom, Haroid. Logging trailer. 4,966,383, Cl. 280-404.000.
SKF GmbH: *See*—
Kunkel, Heinrich; and Olschewski, Armin, 4,966,572, Cl. 474-199.000.
Skinner, Nathan L., to United States of America, Energy. Direct vapor/solid synthesis of mercuric iodide using compounds of mercury and iodine. 4,966,763, Cl. 423-491.000.
Skoda, Hans D.: *See*—
Drawert, Manfred; Krase, Horst; and Skoda, Hans D., 4,966,945, Cl. 525-113.000.
SKODA koncern Plyzen Prvni brneska strojirna koncernoy podnik: *See*—
Hampl, Jan; Taraba, Oldrich; and Valenta, Jiri, 4,967,365, Cl. 364-474.150.
Slanker, Daniel W., to Stillwater Technologies, Inc. Welding tip dresser. 4,966,506, Cl. 409-140.000.
Slawson, Ara M.: *See*—
Slawson, Earnest E., Sr.; and Slawson, Ara M., 4,965,990, Cl. 56-13.700.
Slawson, Earnest E., Sr.; and Slawson, Ara M. Lawn mower and edger assembly. 4,965,990, Cl. 56-13.700.
Slez, Leonid G.; and Tjurin, Jury I., to Makeevsky Inzhenrno-Stroitelny Institut. Air-blasting cartridge. 4,966,326, Cl. 239-99.000.
Sloan-Kettering Institute for Cancer Research: *See*—
Watanabe, Kyoichi A.; and Koyama, Masao, 4,966,918, Cl. 514-656.000.
Smeggil, John G.: *See*—
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., 4,966,229, Cl. 165-41.000.
Smith, Colin P., to Rentokil Limited. Method and apparatus for fumigation of materials. 4,966,755, Cl. 422-28.000.
Smith, David W.: *See*—
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,965,910, Cl. 17-49.000.
Smith, Gary D. Absorbent device. 4,965,900, Cl. 5-463.000.
Smith International, Inc.: *See*—
Keshavan, Madapusi K.; and Rey, Proserfina C., 4,966,627, Cl. 75-240.000.
Smith, Jesse G.: *See*—
Schaub, Frederick S.; and Smith, Jesse G., 4,966,103, Cl. 123-276.000.
Smith, John A.; and Lee, Fang-Jen S., to General Hospital Corporation, The. Isolation, purification, characterization, cloning and sequencing of N α-acetyltransferase. 4,966,848, Cl. 435-193.000.
Smith, Kim R., to Ethyl Corporation. Method of preparing alkoxylated tertiary amines. 4,967,005, Cl. 564-475.000.
Smith, Marvin F., Jr., to Exxon Chemical Patents Inc. Oil additive compositions exhibiting reduced haze containing polymeric viscosity index improver. 4,966,722, Cl. 252-56.00R.
Smith, Patrick L.: *See*—
Wang, Charles C. P.; and Smith, Patrick L., 4,967,063, Cl. 250-201.100.
Smith, Sanford N., to Phillips Petroleum Company. Fluid heated roll apparatus and method. 4,965,920, Cl. 29-112.000.
Smith, Stacia A.: *See*—
Clark, John I.; Farr, Andrew G.; and Smith, Stacia A., 4,966,911, Cl. 514-385.000.
Smith, Steven E.; and Murphy, Kenneth J., to BH-F (Triplex) Inc. Multiple-redundant fault detection system and related method for its use. 4,967,347, Cl. 364-200.000.
Smith, Terence J.: *See*—
Banks, Christopher P.; Irving, Edward; Renner, Alfred; and Smith, Terence J., 4,966,923, Cl. 522-167.000.
Smith, Thurman D.: *See*—
Richardson, David L.; Clark, Jack P.; Kowdley, Balasubramanian S.; Patterson, Peter M.; Perry, Richard W.; and Smith, Thurman D., 4,966,746, Cl. 376-249.000.
Snyder, Richard H.: *See*—
Mapes, Charles W.; and Snyder, Richard H., 4,966,347, Cl. 248-643.000.
Snyder, Rory S. Portable holder and organizer for jewelry and accessories. 4,966,287, Cl. 211-13.000.
So, Chen Y. Innovative structure of cushion. 4,965,898, Cl. 5-468.000.
Soares, George G.: *See*—
Payne, Jewel; Burrascano, Michelle; and Soares, George G., 4,966,765, Cl. 424-93.000.
Sobodos, David W.; and Chalmers, David W., to Agajanian's Ascot Slic Trac, Inc. Impact-absorbing amusement vehicle. 4,966,391, Cl. 280-777.000.
Societe Anonyme dite: Alcatel Cit: *See*—
Mouchart, Jacques; Begel, Jacqueline; and Duda, Eugene, 4,966,438, Cl. 350-173.000.
Societe Anonyme dite: FILOTEX: *See*—
Viaud, Andre ; and Vaille, Francois, 4,967,040, Cl. 174-36.000.
Societe Anonyme dite Hispano-Suiza: *See*—
Fraignier, Bernard; and Roger, Christian, 4,967,092, Cl. 250-560.000.
Societe Anonyme dite: Stein Industrie: *See*—
Fournier, Jean; and Casariego, Adrian, 4,966,100, Cl. 122-6.00A.
Societe Anonyme dite: VALOIS: *See*—
Lina, Jean-Pierre, 4,966,313, Cl. 222-402.190.
Societe Nationale des Poudres et Explosifs: *See*—
Chodorge, Jeannine; Senet, Jean-Pierre; and Wooden, Gary, 4,966,995, Cl. 562-861.000.
Soechtig, Wolfgang, to Krauss-Maffei A.G. Impingement mixing device with pressure controlled nozzle adjustment. 4,966,466, Cl. 366-132.000.
Soga, Hiroo: *See*—
Akutsu, Eiichi; Saitoh, Koichi; Fujimura, Yoshihiko; Inoue, Nanao; Horie, Kiyoshi; Soga, Hiroo; and Fujimagari, Hiroshi, 4,967,206, Cl. 346-135.100.
Soldon Achzakot (1990) Ltd.: *See*—
Karasik, Alexander; and Oron, David, 4,966,406, Cl. 296-98.000.
Solini, Fabio, to Selle San Marco Di Girardi Comm. Luigi S.p.A. Saddle for cycles, motor cycles and the like. 4,967,179, Cl. 340-432.000.
Somar Corporation: *See*—
Kitagawa, Katugi; Akutagawa, Ichiro; and Ono, Kazuya, 4,966,928, Cl. 523-437.000.
Somerton-Rayner, Michael, to Esarco Limited. Vehicle having plural axles and drive system therefor. 4,966,244, Cl. 180-24.090.
Sommer, Herbert, to Jagenberg Aktiengesellschaft. Device for continuously coating a web of material traveling around a backing roller. 4,966,093, Cl. 118-126.000.
Songer, Matthew N.: *See*—
Songer, Robert J.; and Songer, Matthew N., 4,966,600, Cl. 606-74.000.
Songer, Robert J.; and Songer, Matthew N. Surgical securance method. 4,966,600, Cl. 606-74.000.
Sonne Medical, Inc.: *See*—
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, 4,967,061, Cl. 219-438.000.
Sonoda, Fumihiro, to Fuji Photo Film Co., Ltd. Image data conversion device. 4,967,274, Cl. 358-160.000.
Sonoda, Takuji; and Hayashi, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Heterojunction field effect transistor. 4,967,242, Cl. 357-22.000.
Sonolet, Henri C., to Marcadet Mobilier. Sliding shutter composed of articulated slats, particularly for furniture. 4,966,219, Cl. 160-201.000.
Sony Corporation: *See*—
Kanota, Keiji; and Murabayashi, Noboru, 4,967,289, Cl. 360-46.000.
Mori, Hiroshi, 4,967,099, Cl. 307-264.000.
Ogawa, Hiroshi; and Sako, Yoichiro, 4,967,403, Cl. 369-44.260.

Takada, Shinji, 4,967,281, Cl. 358-229.000.

Soo, Hwaili; Ream, Bernard C.; and Robson, John H., to Union Carbide Chemicals and Plastics Company Inc. Monoalkylene glycol production using mixed metal framework compositions. 4,967,018, Cl. 568-867.000.

Sorensen, B. Chuck; and Devroy, Craig A., to Harnischfeger Engineers Inc. Method and apparatus for controlling a storage and retrieval machine. 4,967,130, Cl. 318-652.000.

Sorensen, Charles M.: *See*—
Marler, David O.; Sorensen, Charles M.; and Varghese, Philip, 4,967,020, Cl. 568-896.000.

Sorensen, Jens O. Apparatus and method for injection moulding a thin-walled container having a base wall with a planar interior surface. 4,966,744, Cl. 264-328.100.

Sorrentino, Gregory L.: *See*—
Reymond, Welles K.; and Sorrentino, Gregory L., 4,966,556, Cl. 439-80.000.

Sotralentz S.A.: *See*—
Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, 4,966,293, Cl. 220-1.500.

Sougawa, Masafumi: *See*—
Suzuki, Tamotsu; Suzuki, Toyoshi; Iwashita, Takashi; and Sougawa, Masafumi, 4,965,997, Cl. 66-310.000.

Southern Illinois University Foundation: *See*—
Meyers, Cal Y.; and Chan-Yu-King, Roch, 4,967,021, Cl. 570-101.000.

Spannlang, Ronald: *See*—
Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, 4,966,349, Cl. 266-276.000.

Spector, George: *See*—
Estigoy, Filemon E.; and Spector, George, 4,965,998, Cl. 60-325.000.

Spectrum CVD, Inc.: *See*—
Hillman, Joseph T.; Price, J. B.; and Triggs, William M., 4,966,869, Cl. 437-200.000.

Spectrum Sciences: *See*—
Niv, Yehuda; Landa, Benzion; Levanon, Moshe; Grossinger, Israel; and Adam, Yossi, 4,966,824, Cl. 430-115.000.

Speer, Gregg V.; Ray, Donald L.; and Petre, Mark L., to Emhart Industries, Inc. Electromechanical switch. 4,967,044, Cl. 200-4.000.

Speller, Thomas H., Sr.; Davern, John W.; Weaver, Jeffrey P.; and Andrews, Mark J., to Gemcor Engineering Corp. Five axis riveter and system. 4,966,323, Cl. 227-51.000.

Sprague, David L.; and Simon, Allen H., to Intel Corporation. Apparatus for decoding variable-length encoded data. 4,967,196, Cl. 341-67.000.

Springston, Stephen R., to Associated Universities, Inc. Method for making a non-extractable stationary phase of polymer within a capillary column. 4,966,785, Cl. 427-39.000.

Squires, Glade E.: *See*—
Favstritsky, Nicolai A.; Hein, Arthur J.; and Squires, Glade E., 4,966,716, Cl. 210-755.000.

Stacey, Gary; Nieuwkoop, Anthony J.; and Banfalvi, Zsofia. Recombinant DNA clones containing a broad host range gene from *Bradyrhizobium japonicum* . 4,966,847, Cl. 435-172.300.

Stack, Robert J., to United States of America, Agriculture. Microbial production of L-altrose. 4,966,845, Cl. 435-105.000.

Staggs, R. William, to Northern Precision Twin Cities Inc. Chain saw sharpening device. 4,966,055, Cl. 76-80.500.

Stamicarbon, B.V.: *See*—
Pluyter, Pieter B.; and Rutten, Hendrikus J. J., 4,966,803, Cl. 428-192.000.

Stanasolovich, David: *See*—
Barber, Jeffrey R.; Breiten, Charles P.; Stanasolovich, David; and Theisen, Jacob F., 4,966,870, Cl. 437-228.000.

Stanczak, James J. Fingernail protector. 4,966,174, Cl. 132-73.000.

Standard-Knapp, Inc.: *See*—
Raudat, John L., 4,966,272, Cl. 198-446.000.

Standard Oil Company, The: *See*—
Trigg, Richard D., 4,966,687, Cl. 209-164.000.

Stanley Works, The: *See*—
Kornbrekke, Henning N.; and Boiucaner, Leon, 4,967,083, Cl. 250-341.000.

Stansfield, Michael P.: *See*—
Gunton, David J.; Scott, Howard F.; Stansfield, Michael P.; Cordes, Paul B.; and Ashworth, Roger P., 4,967,199, Cl. 342-22.000.

Stant Inc.: *See*—
Harris, Robert S., 4,966,189, Cl. 137-587.000.

Stapelfeldt, Volker: *See*—
Henkel, Wolfgang E.; Stapelfeldt, Volker; and Belling, Dietrich, 4,966,528, Cl. 417-63.000.

Star Microwave: *See*—
Barnett, Larry R.; and Phillips, Robert M., 4,967,162, Cl. 330-43.000.

Star Technologies, Inc.: *See*—
Pelham, Anthony J.; Steiner, Walter R.; and Didden, William S., 4,967,375, Cl. 364-518.000.

Starev, Lyuben R.: *See*—
Enchev, Ivan D.; Starev, Lyuben R.; Illel, Elieser P.; and Korudanov, Georgi N., 4,966,624, Cl. 75-10.650.

Starks, Charles F.: *See*—
Shepherd, Glen C.; Warriner, Dirk; and Starks, Charles F., 4,967,042, Cl. 174-250.000.

Starlite Co., Ltd.: *See*—
Kobayashi, Takashi; Suzuki, Eiji; and Uchiyama, Yoshitaka, 4,966,030, Cl. 73-7.000.

STE Look rue de la Pigue: *See*—
Mercat, Jean-Pierre, 4,966,380, Cl. 280-259.000.

Stechele, Werner: *See*—
Singer, Heinrich; Stechele, Werner; and Bernhein, Michael, 4,966,725, Cl. 252-8.800.

Steck, Werner; Lermer, Helmut; Rust, Harald; Fritz, Gerhard; and Siegel, Hardo, to BASF Aktiengesellschaft. Preparation of hydroxybenzaldehydes. 4,967,013, Cl. 568-433.000.

Steel, Thomas C. Integral carrying handle for a can carton and carton blank containing same. 4,966,324, Cl. 229-117.130.

Steigerwald, Robert L., to General Electric Company. High efficiency gate driver circuit for a high frequency converter. 4,967,109, Cl. 307-571.000.

Steiner, Walter R.: *See*—
Pelham, Anthony J.; Steiner, Walter R.; and Didden, William S., 4,967,375, Cl. 364-518.000.

Steinhauser, Michael: *See*—
Buerk, Hermann; Wagner, Thomas; and Steinhauser, Michael, 4,966,664, Cl. 204-146.000.

Steininger, Gerd, to Daimler-Benz AG. Plug for the bearing of an autohoist arm against a motor-vehicle body. 4,965,915, Cl. 24-607.000.

Steininger, Karl-Heinz. Polarizable electrode. 4,966,675, Cl. 204-290.00R.

Stelzer, Clarence F., Jr., to O. C. S. Operators, Inc. Method of erecting offshore platforms. 4,966,496, Cl. 405-227.000.

Stengl, Gerhard; Loschner, Hans; Hammell, Ernst; and Glavish, Hilton F., to Oesterreichische Investitionskredit Aktiengesellschaft; and IMS Ionen Mikrofabrikations Systeme Gesellschaft m.b.H. Method and apparatus for image alignment in ion lithography. 4,967,088, Cl. 250-491.100.

Stephen, James C.; Schlosser, Erich H.; and Leja, Andrzej, to Weber-Stephen Products Co. Barbeque kettle. 4,966,125, Cl. 126-25.00R.

Stephens, Howard; and Clark, Roy W. Muffler device for exhaust systems. 4,966,253, Cl. 181-227.000.

Stephens, William F. N.; and Thornton, Shane W., to Renishaw plc. Optical scale reading apparatus. 4,966,429, Cl. 350-96.100.

Stephenson, Dwight B.: *See*—
Schutten, Herman P.; Stephenson, Dwight B.; and Johnson, Oliver W., 4,967,362, Cl. 364-424.070.

Steppan, Hartmut: *See*—
Doenges, Reinhard; Ruckert, Hans; Geissler, Ulrich; and Steppan, Hartmut, 4,966,828, Cl. 430-281.000.

StereoGraphics: *See*—
Lipton, Lenny; and Ackerman, Marvin, 4,967,268, Cl. 358-92.000.

Stern, Howard K.; and Schmuter, Samson L., to Robotic Vision Systems, Inc. Robot and sensor error determination system. 4,967,370, Cl. 364-513.000.

Stevenson, David E.: *See*—
Driggers, Robert H.; and Stevenson, David E., 4,966,062, Cl. 84-327.000.

Stevenson, William S.: *See*—
Lusignea, Richard W.; Stevenson, William S.; and McCoy, John F., III, 4,966,806, Cl. 428-220.000.

Stiefel, Edward I.: *See*—
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; and Beltzer, Morton, 4,966,719, Cl. 252-42.700.

Stieren, Thomas: *See*—
Westernacher, Helmut; Aertken, Karl; and Stieren, Thomas, 4,967,019, Cl. 568-873.000.

Stillwater Technologies, Inc.: *See*—
Slanker, Daniel W., 4,966,506, Cl. 409-140.000.

Stinnertz, Horst, to Mannesmann Aktiengaesellschaft. Method and apparatus for lubricating the mandrel upon the manufacture of seamless tubes by the cold pilger process. 4,966,022, Cl. 72-41.000.

Stipanuk, James J.: *See*—
Davies, Robert B.; Schultz, Warren J.; and Stipanuk, James J., 4,967,336, Cl. 363-132.000.

Stipek, Josef; Bahner, Friedrich; Hose, Horst; Freisinger, Karl; and Eidam, Helmut, to Babcock-Bsh Aktiengesellschaft Vormals Buttner-Schilde-Haas AG. Process for making gypsum fiberboard. 4,966,739, Cl. 264-87.000.

Stockton, Warren D.: *See*—
Miller, Michael K.; and Stockton, Warren D., 4,965,951, Cl. 42-49.010.

Stokar, Saul, to Elscint Ltd. Reducing the effects of coherence in magnetic resonance imaging. 4,966,149, Cl. 128-653.00A.

Stormbom, Lena: *See*—
Linden, Antti; Pennanen, Risto; and Stormbom, Lena, 4,966,615, Cl. 65-12.000.

Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., to Dow Chemical Company, The. Meleic anhydride graft copolymers having low yellowness index and films containing the same. 4,966,810, Cl. 428-335.000.

Strazdins, Atis, to Strazdins (International) Pty. Limited. Double piston colorant dispenser. 4,966,308, Cl. 222-43.000.

Strazdins (International) Pty. Limited: *See*—
Strazdins, Atis, 4,966,308, Cl. 222-43.000.

Stretz, Lawrence A.: *See*—
Sanchez, John A.; Roemer, Edward L.; and Stretz, Lawrence A., 4,967,000, Cl. 564-242.000.

Strother, Charles E.: *See*—
Warner, Charles Y.; Strother, Charles E.; Struble, Donald E.; and Wille, Milton G., 4,966,388, Cl. 280-730.000.

Struble, Donald E.: *See*—
Warner, Charles Y.; Strother, Charles E.; Struble, Donald E.; and Wille, Milton G., 4,966,388, Cl. 280-730.000.

Stumpf, William E.: *See*—
Bessinger, Walter L.; Stumpf, William E.; and Carlson, Casey L., 4,966,343, Cl. 248-243.000.

Subramanian, Pallatheri M., to Du Pont de Nemours, E. I., and Company. Nylon compositions for blowmolding. 4,966,941, Cl. 525-66.000.

Suda, Toshiyasu: *See*—
Honma, Yasuhiro; Miyazaki, Nobuo; Misumi, Hisashi; Suda, Toshiyasu; Akazaki, Shuichi; Minematsu, Yoshihiro; and Kawai, Michio, 4,966,158, Cl. 128-734.000.

Suefuji, Mineo: *See*—
Terai, Fumitaka; Yukawa, Kimio; and Suefuji, Mineo, 4,966,792, Cl. 427-358.000.

Suenaga, Haruo: *See*—
Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.

Sugano, Takao: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.

Sugarman, Harvey L.: *See*—
Rayman, Gerrard A.; Sugarman, Harvey L.; and Harris, Ivan P., 4,966,588, Cl. 604-165.000.

Sugarman, Joseph. Strap for glasses. 4,965,913, Cl. 24-3.00C.

Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, to Nissan Motor Co., Ltd. Automotive suspension control system with road-condition-dependent damping characteristics. 4,967,359, Cl. 364-424.050.

Sugawa, Shigetoshi: *See*—
Hashimoto, Seiji; Satoh, Tamotsu; and Sugawa, Shigetoshi, 4,967,067, Cl. 250-208.100.

Sugawara, Toshio: *See*—
Kawasaki, Kiyohito; Umezawa, Yujiro; and Sugawara, Toshio, 4,966,216, Cl. 152-556.000.

Sugaya, Mamoru: *See*—
Saeki, Kenshi; Kawasaki, Iwao; Shikaze, Yoshikazu; and Sugaya, Mamoru, 4,966,634, Cl. 148-251.000.

Sugimori, Teruhiko: *See*—
Matsumoto, Tsuruyoshi; Yamamoto, Takashi; Sugimori, Teruhiko; and Shimada, Katsuhiko, 4,966,435, Cl. 350-96.340.

Sugimoto, Shigetoshi: *See*—
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.

Sugimoto, Yukihiro: *See*—
Takasuga, Shunzo; Sugimoto, Yukihiro; Noguchi, Keiichiro; and Urabe, Motohmi, 4,966,221, Cl. 164-120.000.

Sugino, Takuya: *See*—
Fujimoto, Sachito; Sugino, Takuya; Takahasi, Shunji; and Hashiguchi, Makoto, 4,966,111, Cl. 123-339.000.

Sugiyama, Isao: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 4,966,804, Cl. 428-203.000.

Sullivan, Donald F., to Atochem North America, Inc. Polymer printing. 4,966,827, Cl. 430-270.000.

Sullivan, Valerie C.: *See*—
Rosi, Ronald; and Sullivan, Valerie C., 4,966,278, Cl. 206-444.000.

Sulzer Brothers Limited: *See*—
Baumann, Heinz; Mutter, Heinz; Schreiber, Kurt; and Thurig, Peter, 4,966,206, Cl. 141-83.000.

Sumita, Mutsutaka; and Kurachi, Takayoshi, to Mitsubishi Denki Kabushiki Kaisha. CRT displaying method in numerical control devices. 4,967,189, Cl. 340-679.000.

Sumitomo Chemical Company, Limited: *See*—
Aki, Seietsu; and Shinjo, Goro, 4,966,796, Cl. 428-34.300.
Maki, Hiroshi; and Sasaki, Shigeru, 4,967,004, Cl. 564-397.000.
Tsuji, Mitsuji; Usuda, Eiichi; and Aoshima, Masashi, 4,966,940, Cl. 525-66.000.

Sumitomo Electric Industries, Ltd.: *See*—
Nomura, Toshio; and Chudo, Masuo, 4,966,501, Cl. 407-119.000.
Sato, Kenichi, 4,966,635, Cl. 148-275.000.
Yoncchi, Shinichi; Ishida, Yukinori; and Kawase, Masaaki, 4,966,434, Cl. 350-96.230.

Sumitomo Metal Industries, Ltd.: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Sumner, John P.; Johnson, Robert G.; and Higashi, Robert E., to Honeywell Inc. Cantilever semiconductor device. 4,966,037, Cl. 73-204.260.

Sun, Cliff C.: *See*—
Park, Kyong; Nassar, Marcos A.; and Sun, Cliff C., 4,967,071, Cl. 250-227.210.

Sun, Horng-Jye; and Morley, Bruce C., to Teledyne MEC. FET monolithic microwave integrated circuit variable slope gain-equalizer. 4,967,169, Cl. 333-28.00R.

Sunami, Hideo: *See*—
Kaga, Toru; Kawamoto, Yoshifumi; and Sunami, Hideo, 4,967,247, Cl. 357-23.600.

Sundstrand Corporation: *See*—
Ames, John; Lang, David J.; and Walsh, Richard E., 4,966,067, Cl. 92-150.000.
Cook, Alexander; Dhyanchand, John; Palaniappan, Rasappa; and Schmitt, Dwight, 4,967,334, Cl. 363-34.000.
Diemer, John W.; and Teagardin, Michael D., 4,967,096, Cl. 307-19.000.
Rees, Fenton L., 4,967,122, Cl. 318-254.000.
Rozman, Gregory I.; and Maddali, Vijay K., 4,967,132, Cl. 318-798.000.
Vershure, Roy W., Jr.; and Weber, Kent, 4,965,995, Cl. 60-39.142.

Sundstrom, Erik: *See*—
Eriksson, Lars-Olov; and Sundstrom, Erik, 4,965,934, Cl. 30-387.000.

Suni, Paul P., to Loral Fairchild Corporation. Gain compression photodetector array. 4,967,249, Cl. 357-24.000.

Sutherland, John N.: *See*—
Jean-Jacques, Leonard; and Sutherland, John N., 4,965,971, Cl. 52-199.000.

Suzuki, Akira; and Furukawa, Katsuki, to Sharp Kabushiki Kaisha. Process for producing a SiC semiconductor device. 4,966,860, Cl. 437-31.000.

Suzuki, Akira: *See*—
Matsuda, Shoichi; Suzuki, Akira; and Kaise, Tatsuo, 4,966,853, Cl. 435-284.000.

Suzuki, Chiaki; and Shimizu, Shigehisa, to Fuji Photo Film Co., Ltd. System for winding film on a spool and loading the spool with the film into a magazine. 4,965,931, Cl. 29-783.000.

Suzuki, Eiji: *See*—
Kobayashi, Takashi; Suzuki, Eiji; and Uchiyama, Yoshitaka, 4,966,030, Cl. 73-7.000.

Suzuki, Keitaro: *See*—
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.

Suzuki, Makoto; Sakai, Toshio; Hattori, Tomoaki; and Takagi, Izumi, to Brother Kogyo Kabushiki Kaisha. Color image recording apparatus with mask member registering mechanism. 4,967,227, Cl. 355-32.000.

Suzuki, Nobuhisa: *See*—
Hihara, Mikio; and Suzuki, Nobuhisa, 4,966,463, Cl. 366-3.000.

Suzuki, Nobuo; Sakasai, Yutaka; and Sato, Hideo, to Fuji Photo Film Co., Ltd. Method for producing electrophotographic liquid developer. 4,966,825, Cl. 430-137.000.

Suzuki, Ryoichi, to Canon Kabushiki Kaisha. Distance measuring device. 4,967,223, Cl. 354-402.000.

Suzuki, Shigeru; Ohshiro, Katsuhiko; and Watanabe, Yasushi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Variable displacement vane compressor. 4,966,531, Cl. 417-295.000.

Suzuki, Shingo: *See*—
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, 4,966,432, Cl. 350-96.150.

Suzuki, Shohei: *See*—
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.

Suzuki, Takashi, to Sharp Kabushiki Kaisha. Electrocardiograph operable to form updated sequential series of cardiographic signals. 4,966,157, Cl. 128-696.000.

Suzuki, Tamotsu; Suzuki, Toyoshi; Iwashita, Takashi; and Sougawa, Masafumi, to Sanshin Kogyo Kabushiki Kaisha. Exhaust system for outboard motor. 4,965,997, Cl. 66-310.000.

Suzuki, Toyoshi: *See*—
Suzuki, Tamotsu; Suzuki, Toyoshi; Iwashita, Takashi; and Sougawa, Masafumi, 4,965,997, Cl. 66-310.000.

Suzuki, Yoichi: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.

Suzuki, Yoshiro: *See*—
Itou, Syunji; Suzuki, Yoshiro; and Sakaguchi, Minoru, 4,967,307, Cl. 361-335.000.

Suzuki, Youhei: *See*—
Tomoshige, Toru; Fujii, Yasunasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.

Svarczkopf, Walter A.: *See*—
Barish, Arnold E.; Kiesling, David A.; Mayo, Mark D.; and Svarczkopf, Walter A., 4,967,151, Cl. 324-158.00T.

Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., to General Electric Company. Transfer tube. 4,966,201, Cl. 138-141.000.

Swan, George A., III: *See*—
Baird, William C., Jr.; Riley, Kenneth L.; and Swan, George A., III, 4,966,880, Cl. 502-242.000.

Swanson, David E.; and Schlumpberger, Michael X., to United States of America, Interior. Method of effecting expanding chemical anchor/seals for rock cavities. 4,966,237, Cl. 166-292.000.

Swiatosz, Edmund, to United States of America, Navy. Oxygen breathing bag simulator. 4,966,139, Cl. 128-205.230.

Sykes, Philip K.; and Schmitz, Stephen R., to Blackbourn Inc. Cassette album with channel-form hinges and method. 4,966,283, Cl. 206-387.000.

Syntron, Inc.: *See*—
Woods, Theodore E., 4,967,400, Cl. 367-21.000.

Syrja, Lasse: *See*—
Rantala, Mauri; and Syrja, Lasse, 4,966,653, Cl. 162-273.000.

Szajnowski, Wieslaw J., to Varian Associates, Inc. Dual channel signal processor using weighted integration of log-ratios and ion beam position sensor utilizing the signal processor. 4,967,380, Cl. 364-550.000.

Szala, Lawrence E.: *See*—
Svec, Paul S.; Borom, Marcus P.; Szala, Lawrence E.; Brun, Milivoj K.; Miller, Steven A.; and Mourer, David P., 4,966,201, Cl. 138-141.000.

Tabata, Nobuchika: *See*—
Akitaya, Shinichi; Fukazawa, Toru; Nozokido, Yutaka; and Tabata, Nobuchika, 4,966,931, Cl. 524-100.000.

Tabor, Ricky L.: *See*—
Strait, Chad A.; Tabor, Ricky L.; and Lancaster, Gerald M., 4,966,810, Cl. 428-335.000.

Tabuchi, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Method of compensating for backlash caused after cutting off recording paper on facsimile apparatus. 4,967,285, Cl. 358-304.000.

Tachibana, Kouzou: *See*—
Hasegawa, Masaki; Saigo, Kazuhiko; Yuki, Yoichi; and Tachibana, Kouzou, 4,966,985, Cl. 556-116.000.

Tachibana, Yosuke: *See*—
Seki, Yasunari; Koike, Yuzuru; Tachibana, Yosuke; and Tsukimura, Kiyoshi, 4,966,110, Cl. 123-327.000.

Tacke, Peter; Bottenbruch, Ludwig; Buysch, Hans-Josef; Grigo, Ulrich; and Alewelt, Wolfgang, to Bayer Aktiengesellschaft. Process for the preparation of aromatic polyesters. 4,966,958, Cl. 528-271.000.

Tagawa, Koichi, to Maeda Industries, Ltd. Bicycle speed change lever assembly. 4,966,046, Cl. 74-502.200.

Taguchi, Masaru; Kuroki, Yasuhiro; Uchida, Yoshiharu; and Kawano, Saburo, to Toshiba Kikai Kabushiki Kaisha. Molding machines using rotary screws. 4,966,540, Cl. 425-208.000.

Taguchi, Michio: *See*—
Hirano, Takashi; Taguchi, Michio; and Nishide, Kazuhiro, 4,967,383, Cl. 364-567.000.

Taguchi, Toshio: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Tajima, Youichiro, to Casio Computer Co., Ltd. Effect tone generating apparatus. 4,966,051, Cl. 84-663.000.

Takada, Juichiro. Inflatable air bag for protection of a vehicle occupant. 4,966,389, Cl. 280-743.000.

Takada, Shinji, to Sony Corporation. Camera with exchangeable lens device removably mounted on a camera body. 4,967,281, Cl. 358-229.000.

Takada, Yoshiyuki: *See*—
Kodama, Tatsuaki; and Takada, Yoshiyuki, 4,966,524, Cl. 415-223.000.

Takagi, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Wafer having a dicing area having a step region covered with a conductive layer and method of manufacturing the same. 4,967,259, Cl. 357-68.000.

Takagi, Izumi: *See*—
Suzuki, Makoto; Sakai, Toshio; Hattori, Tomoaki; and Takagi, Izumi, 4,967,227, Cl. 355-32.000.

Takagi, Seiichi: *See*—
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, 4,966,829, Cl. 430-109.000.

Takagishi, Ikuo: *See*—
Watanabe, Hitosi; Takagishi, Ikuo; Kosaka, Toshinobu; and Kawabata, Katsuhiko, 4,966,480, Cl. 401-134.000.

Takahama, Tomohiko: *See*—
Takahashi, Hideyuki; Suzuki, Shobei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.

Takahashi, Hideaki: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.

Takahashi, Hideyuki; Suzuki, Shobei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, to Mitsubishi Petrochemical Co., Ltd.; and Huls Aktiengesellschaft. Method of inhibiting polymerization of styrenes. 4,967,027, Cl. 585-5.000.

Takahashi, Hiroaki: *See*—
Furuhata, Takashi; Takahashi, Hiroaki; and Katsuki, Masabu, 4,967,161, Cl. 328-22.000.

Takahashi, Hiroshi, to Nissan Motor Co., Ltd. Shift control system for automatic transmission. 4,966,049, Cl. 74-866.000.

Takahashi, Katsuhiko, to Polyplastics Co., Ltd. Non-flammable polybutylene terephthalate composition. 4,966,935, Cl. 524-412.000.

Takahashi, Nobuyoshi: *See*—
Yamauchi, Shiro; Rito, Naotake; and Takahashi, Nobuyoshi, 4,967,295, Cl. 360-97.020.

Takahashi, Tohru: *See*—
Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, 4,967,359, Cl. 364-424.050.

Takahasi, Shunji: *See*—
Fujimoto, Sachito; Sugino, Takuya; Takahasi, Shunji; and Hashiguchi, Makoto, 4,966,111, Cl. 123-339.000.

Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, to Toa Nenryo Kogyo Kabushiki Kaisha. Process for preparing epoxy group-containing silanes. 4,966,981, Cl. 549-215.000.

Takakashi, Sadahiro: *See*—
Sugasawa, Fukashi; Ito, Ken; Takahashi, Tohru; Takakashi, Sadahiro; and Fujishiro, Takashi, 4,967,359, Cl. 364-424.050.

Takaki, Usaji; Aoki, Shinobu; Yamamoto, Yoshihiro; and Hara, Isao, to Mitsui Toatsu Chemicals, Incorporated. Process for the preparation of indigo compounds. 4,966,977, Cl. 548-457.000.

Takaku, Hitoshi, to Jidosha Kiki Co., Ltd. Interconnecting construction between mounting plate and bolt. 4,966,512, Cl. 411-181.000.

Takano Co., Ltd.: *See*—
Katagiri, Miyoshi; Ito, Tunetaro; Miyashita, Masamitu; Kaneda, Shinichi; Suzuki, Yoichi; and Sugano, Takao, 4,966,411, Cl. 297-301.000.

Takano, Hiroyuki: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,966,900, Cl. 514-206.000.

Takara Kosan Co., Ltd.: *See*—
Nakamura, Akira; and Matsuzawa, Junichi, 4,966,568, Cl. 446-221.000.

Takasago, Hayato: *See*—
Niki, Kenichi; Kokogawa, Toru; and Takasago, Hayato, 4,967,261, Cl. 357-70.000.

Takasaki, Yoshimi: *See*—
Shuji, Ono; Kimura, Tsutomu; and Takasaki, Yoshimi, 4,967,073, Cl. 250-235.000.

Takasaki, Yoshitaka: *See*—
Takase, Akihiko; and Takasaki, Yoshitaka, 4,967,410, Cl. 370-105.100.

Takase, Akihiko; and Takasaki, Yoshitaka, to Hitachi, Ltd. Method of multiplexing digital signals and apparatus therefor. 4,967,410, Cl. 370-105.100.

Takasuga, Shunzo; Sugimoto, Yukihiro; Noguchi, Keiichiro; and Urabe, Motohumi, to Mazda Motor Corporation. Method of producing aluminum alloy castings and piston made of aluminum alloy. 4,966,221, Cl. 164-120.000.

Takaya, Soichi: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.

Takebuchi, Ryuichi: *See*—
Yokota, Keiichi; and Takebuchi, Ryuichi, 4,966,520, Cl. 414-786.000.

Takeda Chemical Industries, Ltd.: *See*—
Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,966,973, Cl. 546-269.000.
Sasaki, Ichiro; Oshima, Junji; and Yamada, Minoru, 4,966,942, Cl. 525-67.000.

Takeda, Tsuneharu, to Casio Computer Co., Ltd. Optical device using magnetic thin films and electric field means. 4,966,445, Cl. 350-377.000.

Takefumi, Tadayoshi: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shusichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.

Takehana, Hiroshi: *See*—
Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, 4,966,915, Cl. 514-531.000.

Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, to Hitachi, Ltd.; and Kasado Kikai Co., Ltd. Construction and a manufacturing method of underframe for a rolling stock. 4,966,082, Cl. 105-422.000.

Takekoshi, Masayo: *See*—
Ito, Tsukasa; Kawakatsu, Satoshi; Onishi, Akira; and Takekoshi, Masayo, 4,966,856, Cl. 436-170.000.

Takemori, Tamiki, to Hamamatsu Photonics Kabushiki Kaisha. Deformation measuring method and device using cross-correlation function between speckle patterns with reference data renewal. 4,967,093, Cl. 250-560.000.

Takeoka, Seiei: *See*—
Saito, Masatsugu; Ikeda, Chikamasa; Takeoka, Seiei; and Katsutani, Kazuji, 4,967,178, Cl. 340-425.500.

Takeshita, Fusayuki: *See*—
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,966,727, Cl. 252-299.610.

Takeuchi, Hitoshi: *See*—
Itoh, Hideki; and Takeuchi, Hitoshi, 4,966,120, Cl. 123-516.000.

Takeuchi, Kiyoshi, to Nissan Motor Co., Ltd. Instrument for testing lubricating oil. 4,966,032, Cl. 73-64.000.

Takeuchi, Yasuhito, to Yokogawa Medical Systems Limited. Ultrasonic diagnostic apparatus. 4,966,151, Cl. 128-660.050.

Takeura, Tooru: *See*—
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, 4,967,299, Cl. 360-121.000.

Takiguchi, Yoshihiro: *See*—
Urakami, Tsuneyuki; and Takiguchi, Yoshihiro, 4,967,080, Cl. 250-336.100.

Takiron Co., Ltd.: *See*—
Shikinami, Yasuo; Tsuta, Kaoru; Taniguchi, Masahiko; and Boutani, Hidekazu, 4,966,953, Cl. 528-60.000.

Takuma, Masao; Haruki, Toshinobu; and Kikuchi, Kenichi, to Sanyo Electric Co., Ltd. Image sensing apparatus having automatic focusing function of automatically matching focus in response to video signal. 4,967,280, Cl. 358-227.000.

Takuwa, Kenji: *See*—
Kawakami, Ken-ichi; Murakami, Masatsugi; and Takuwa, Kenji, 4,966,933, Cl. 524-310.000.
Talapin, Vitaly I.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Tallen, Michael J.; and Fenton, Dennis M., to Amgen. Method for microbial cell killing. 4,966,844, Cl. 435-71.200.
Tam, Wilson: *See*—
Clement, Robert A.; Tam, Wilson; and Wang, Ying, 4,966,730, Cl. 252-589.000.
Tamamura, Hideo, to Showa Denko Kabushiki Kaisha. Process for preparation of neodymium or neodymium alloy. 4,966,661, Cl. 204-64.00R.
Tamamura, Hideo, to Showa Denko Kabushiki Kaisha. Process for preparing praseodynium metal or praseodymium-containing alloy. 4,966,662, Cl. 204-71.000.
Tamegaya, Yukio, to NEC Corporation. Emitter-coupled logic circuit. 4,967,106, Cl. 307-455.000.
Tamura, Satoshi: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 4,966,804, Cl. 428-203.000.
Tamura, Toshio: *See*—
Yagi, Takeshi; and Tamura, Toshio, 4,967,406, Cl. 370-16.000.
Tan, Larry U. L.: *See*—
Yu, Ernest K. C.; Tan, Larry U. L.; and Saddler, John N., 4,966,850, Cl. 435-200.000.
Tanabe, Harumasa: *See*—
Sato, Yoshiki; Yamamoto, Yoshitaka; Mito, Yutaka; and Tanabe, Harumasa, 4,966,978, Cl. 548-469.000.
Tanabe Seiyaku Co., Ltd.: *See*—
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, 4,966,899, Cl. 514-197.000.
Tanabe, Takeshi: *See*—
Kaneshiro, Tetuya; and Tanabe, Takeshi, 4,967,049, Cl. 219-10.55B.
Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; Urakami, Tatsuhiro; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Polymaleimide from polyarylene polyamine and process for the preparation thereof. 4,966,961, Cl. 528-345.000.
Tanagawa: Kouzi, to OKI Electric Industry Co., Ltd. EEPROM system with bit error detecting function. 4,967,415, Cl. 371-51.100.
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, to Yamanouchi Pharmaceutical Co., Ltd. Substituted tetrahydroisoquinoline compounds, and process for producing them, and composition containing them. 4,966,904, Cl. 514-301.000.
Tanaka, Akio, to NEC Corporation. Structure of insulated gate bipolar transistors. 4,967,246, Cl. 357-23.400.
Tanaka, Koichi; Mikami, Akiyoshi; and Taniguchi, Kouji, to Sharp Kabushiki Kaisha. Thin film electroluminescent device containing gadolinium and rare earth elements. 4,967,251, Cl. 357-30.000.
Tanaka, Masahide: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.
Tanaka, Mitsutoshi; Arai, Fuminori; Terashima, Kaoru; and Yaginuma, Nakatsugu, to Fuji Photo Film Co., Ltd. Method of preparing integral multilayer analytical element. 4,966,784, Cl. 427-2.000.
Tanaka, Seiichi, to Mitsubishi Denki Kabushiki Kaisha. Power system stabilizer. 4,967,129, Cl. 318-621.000.
Tanaka, Takahumi; and Ooshima, Nobuyasu, to Brother Kogyo Kabushiki Kaisha. Fabric edge trace stitching system. 4,966,090, Cl. 112-456.000.
Tanaka, Toshiaki: *See*—
Kinoshita, Hideaki; and Tanaka, Toshiaki, 4,967,241, Cl. 357-19.000.
Tanaka, Toshio: *See*—
Shibasaki, Nobuo; Tanaka, Toshio; Nagayama, Yoshiharu; and Yasunari, Kenjiro, 4,967,387, Cl. 364-580.000.
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, to Showa Denko Kabushiki Kaisha. Water-absorbing composite body. 4,966,809, Cl. 428-323.000.
Tanaka, Toyoyasu; Yamamoto, Yasuyoshi; and Kaga, Yuzou, to Menicon Co., Ltd. Contact lens cleaning device. 4,965,904, Cl. 15-97.100.
Tanaka, Yoshinori, to Pola Chemical Industries Ltd. Method and apparatus for charging transparent material. 4,966,205, Cl. 141-9.000.
Tanaka, Yoshinori: *See*—
Yoshida, Kazuhiro; and Tanaka, Yoshinori, 4,966,008, Cl. 62-137.000.
Tandem Computers Incorporated: *See*—
Ferchau, Joerg U.; Pham, Hoa V.; and Diaz, Randall J., 4,967,311, Cl. 361-395.000.
Tani, Hisashi: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Tani, Tatsuo; Watanabe, Mutsuo; and Muramatsu, Shigeru, to Ricoh Company, Ltd. Image forming apparatus. 4,967,234, Cl. 355-260.000.
Taniguchi, Hiroji: *See*—
Iwatsuki, Kunihiro; and Taniguchi, Hiroji, 4,967,355, Cl. 364-424.100.
Taniguchi, Kouji: *See*—
Tanaka, Koichi; Mikami, Akiyoshi; and Taniguchi, Kouji, 4,967,251, Cl. 357-30.000.
Taniguchi, Masahiko: *See*—
Shikimani, Yasuo; Tsuta, Kaoru; Taniguchi, Masahiko; and Boutani, Hidekazu, 4,966,953, Cl. 528-60.000.
Taniguchi, Nobuhiro: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Camera on which a front converter can be mounted. 4,967,214, Cl. 354-79.000.
Taniguchi, Nobuyuki: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.
Tanimura, Yukinori: *See*—
Atsuta, Mitsuru; Sakashita, Takeshi; Miyamoto, Ryoichi; Tanimura, Yukinori; and Fuji, Saburo, 4,966,766, Cl. 424-422.000.
Tanno, Kiyohiko: *See*—
Hirane, Hideo; Tanno, Kiyohiko; and Iizuka, Hisao, 4,967,192, Cl. 340-811.000.
Tansei, Hikaru: *See*—
Kawaguchi, Yasuyoshi; Ohashi, Masayuki; and Tansei, Hikaru, 4,966,213, Cl. 152-504.000.
Taraba, Oldrich: *See*—
Hampl, Jan; Taraba, Oldrich; and Valenta, Jiri, 4,967,365, Cl. 364-474.150.
Tarr, Richard R.: *See*—
Engelhardt, John A.; and Tarr, Richard R., 4,966,509, Cl. 409-281.000.
Tatavoosian, Vanacan, to Eaton Corporation. Omnidirectional shock absorbing lamp mounting system for illuminated apparatus. 4,967,328, Cl. 362-267.000.
Tatavoosian, Vanacan; and Schaeffer, George E., to Eaton Corporation. Lens mounting and seal for illuminated apparatus. 4,967,329, Cl. 362-267.000.
Tate, Larry R., to Harris Semiconductor Patents Inc. Truncated product partial canonical signed digit multiplier. 4,967,388, Cl. 364-760.000.
Tatsumi, Yuuichi: *See*—
Minagawa, Hidenobu; Tatsumi, Yuuichi; Iwahashi, Hiroshi; Asano, Masamichi; and Imai, Mizuho, 4,967,394, Cl. 365-201.000.
Tatumi, Takumi: *See*—
Mimura, Munehiko; Tatumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,967,357, Cl. 364-426.040.
Tayca Corporation: *See*—
Okuda, Masaaki, 4,966,630, Cl. 106-426.000.
Taylor, Clarence R. Adjustable appendage for mattress providing means. 4,965,897, Cl. 5-446.000.
Taylor, Murland L. Bulk bag emptying apparatus and method. 4,966,311, Cl. 222-105.000.
Tazoe, Nobuhiro: *See*—
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, 4,966,025, Cl. 72-184.000.
TDK Corporation: *See*—
Mochizuki, Kazuo, 4,966,031, Cl. 73-35.000.
Teagardin, Michael D.: *See*—
Diemer, John W.; and Teagardin, Michael D., 4,967,096, Cl. 307-19.000.
Tecno S.p.A. Mobili e Forniture per Arredamento: *See*—
Borsani, Paolo, 4,966,341, Cl. 248-165.000.
Tecumseh Products Company: *See*—
von Kaler, Roland L.; and Page, Rocky H., 4,966,574, Cl. 475-206.000.
Wisner, Ronald R., 4,966,559, Cl. 439-566.000.
Teets, Michael R.; Kerby, Keith A.; Rafferty, Michael P.; Carver, Wayne D.; and Shrodes, Robert, Jr., to Chrysler Corporation. Fuel assembly having a vapor vent with a hinged float valve. 4,966,299, Cl. 220-85.0VR.
Tehrani, Abolghassem Y.: *See*—
Allington, Robert W.; Tehrani, Abolghassem Y.; and Jones, John N., 4,966,696, Cl. 210-198.200.
Teijin Seiki Company Limited: *See*—
Hirai, Masanori, 4,967,124, Cl. 318-564.000.
Teisseir, Etienne M.; and Marie, Bruno A. E. Free transfer machine with independent motorized carriages. 4,966,080, Cl. 104-289.000.
Tektronix, Inc.: *See*—
Berg, William E.; and Lueker, Jonathan C., 4,967,175, Cl. 336-65.000.
Teldix GmbH: *See*—
Hettlage, Eckart; and Ruff, Gerd, 4,967,170, Cl. 333-106.000.
Teleco Oilfield Services Inc.: *See*—
Whitten, Ronald G., 4,966,234, Cl. 166-250.000.
Telectronics, N.V.: *See*—
Foote, Roger M. L., 4,966,564, Cl. 439-840.000.
Teledyne MEC: *See*—
Sun, Horng-Jye; and Morley, Bruce C., 4,967,169, Cl. 333-28.00R.
Telefunken Systemtechnik GmbH: *See*—
Weidel, Edgar, 4,966,430, Cl. 350-96.110.
Temple University: *See*—
Labes, Mortimer M.; and Chen, J. H., 4,966,817, Cl. 428-552.000.

Tempress, Inc.: *See*—
Cedergreen, Steven D.; Aspiri, Ray; Hunter, Kim R.; and Chiu, Butkai, 4,965,958, Cl. 43-55.000.
Tencor Instruments: *See*—
Berger, Josef; Neukermans, Armand P.; and Vaught, John L., 4,967,095, Cl. 250-572.000.
Tennant Company: *See*—
Field, Bruce F.; and Hunt, Paul C., 4,967,064, Cl. 250-203.200.
Terada, Katsuyuki: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Terai, Fumitaka; Yukawa, Kimio; and Suefuji, Mineo, to Fuji Photo Film Co., Ltd. Method of producing gradient gel medium membrane for electrophoresis. 4,966,792, Cl. 427-358.000.
Teramura, Satoshi: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.
Terasawa, Koji; Okamoto, Hideaki; and Yamaguchi, Hideki, to Canon Kabushiki Kaisha. Method for ensuring stable operation of an ink jet recording apparatus. 4,967,204, Cl. 346-1.100.
Terashima, Kanetsugu: *See*—
Ichihashi, Mitsuyoshi; Terashima, Kanetsugu; Kikuchi, Makoto; Takeshita, Fusayuki; and Furukawa, Kenji, 4,966,727, Cl. 252-299.610.
Terashima, Kaoru: *See*—
Tanaka, Mitsutoshi; Arai, Fuminori; Terashima, Kaoru; and Yaginuma, Nakatsugu, 4,966,784, Cl. 427-2.000.
Terasse, Jean-Francois: *See*—
Canitrot, Didier; Ducrot, Christian; and Terasse, Jean-Francois, 4,967,137, Cl. 322-7.000.
Terumo Kabushiki Kaisha: *See*—
Sasaki, Masatomi; Morita, Hirotomo; and Matsumoto, Yutaka, 4,966,699, Cl. 210-321.800.
Tescor, Inc.: *See*—
Buchanan, William W., 4,967,354, Cl. 364-419.000.
Teshima, Nobue: *See*—
Kato, Yasuyoshi; Konishi, Kunihiko; Akama, Hiroshi; Matsuda, Toshiaki; and Teshima, Nobue, 4,966,882, Cl. 502-309.000.
Texas Instruments Incorporated: *See*—
Davis, Cecil J.; Matthews, Robert; and Bowling, Robert A., 4,966,519, Cl. 414-786.000.
English, Roe E.; Kilgore, Michael A.; and Crone, Jerry A., 4,967,337, Cl. 364-184.000.
Mahler, Theodor W., 4,967,102, Cl. 307-270.000.
Pathak, Vijay K.; and Green, Christopher T., 4,967,256, Cl. 357-38.000.
Shepherd, Glen C.; Warriner, Dirk; and Starks, Charles F., 4,967,042, Cl. 174-250.000.
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey E., 4,966,865, Cl. 437-192.000.
Texas Iron Works, Inc.: *See*—
Braddick, Britt O., 4,966,236, Cl. 166-291.000.
Theeuwes, Felix: *See*—
Guittard, George V.; Wong, Patrick S. L.; Theeuwes, Felix; and Cortese, Richard, 4,966,769, Cl. 424-473.000.
Theisen, Jacob F.: *See*—
Barber, Jeffrey R.; Breiten, Charles P.; Stanasolovich, David; and Theisen, Jacob F., 4,966,870, Cl. 437-228.000.
Therrien, Lise: *See*—
Houle, Jean C.; and Therrien, Lise, 4,966,373, Cl. 273-339.000.
Thieler, William R. Method for opening and closing surgical wounds. 4,966,605, Cl. 606-214.000.
Thomas, Herman A. Apparatus for preventing the spreading of Acquired Immune Deficiency Syndrome (AIDS). 4,966,594, Cl. 604-349.000.
Thomas, John C.: *See*—
Brekkestran, Kevin L.; and Thomas, John C., 4,967,385, Cl. 364-571.030.
Thomas, Rudy V.; and Towers, Kenneth S., to Allied-Signal Inc. Automotive passive comfort seat belt system. 4,966,394, Cl. 280-807.000.
Thomason, Derek A.: *See*—
Moore, Christopher P.; and Thomason, Derek A., 4,966,678, Cl. 204-418.000.
Thompson, Bjorn J.; Hustad, Gerald O.; and Marnocha, Todd S., to Oscar Mayer Foods Corporation. Tamper-evident, reclosable, flexible packages. 4,966,470, Cl. 383-61.000.
Thompson, David: *See*—
Dechambeau, Scott A.; Torkelson, Robert; and Thompson, David, 4,966,217, Cl. 160-35.000.
Thompson, Taylor N., Sr.: *See*—
Fraser, Douglas S.; and Thompson, Taylor N., Sr., 4,966,469, Cl. 374-208.000.
Thomson-CSF: *See*—
Ariel, Joelle; and Legendre, Jacques, 4,967,172, Cl. 333-161.000.
Quievy, Didier; and Desjouis, Francis, 4,967,160, Cl. 328-16.000.
Thornton, Neill R.: *See*—
Cogan, Adrian I.; and Thornton, Neill R., 4,967,245, Cl. 357-23.400.
Thornton, Shane W.: *See*—
Stephens, William F. N.; and Thornton, Shane W., 4,966,429, Cl. 350-96.100.
Thuesen, Sven E.; and Gollnow, Klaus, to Danfoss A/S. Refrigeration plant and method of controlling a refrigeration plant. 4,966,006, Cl. 62-89.000.
Thummel, Rudolf C.: *See*—
Rempfler, Hermann; Durr, Dieter; and Thummel, Rudolf C., 4,966,622, Cl. 71-92.000.
Thurig, Peter: *See*—
Baumann, Heinz; Mutter, Heinz; Schreiber, Kurt; and Thurig, Peter, 4,966,206, Cl. 141-83.000.
Thurlow, Heida L. Potrack light fixture. 4,967,327, Cl. 362-249.000.
Tielert, Reinhard: *See*—
Risch, Lothar; Tielert, Reinhard; Mueller, Wolfgang; and Werner, Christoph, 4,966,859, Cl. 437-29.000.
Tierney Turbines, Incorporated: *See*—
Sherikar, Sanjay V., 4,966,523, Cl. 415-208.400.
Tiger Industries, Inc.: *See*—
Hutchison, Marion E., 4,966,239, Cl. 172-20.000.
Tikhonova, Tatyana S.: *See*—
Fedin, Marat A.; Kuznetsova, Tatyana A.; Lysenkov, Viktor I.; Talapin, Vitaly I.; Novikova, Svetlana A.; Polovinkin, Leonid V.; Savchuk, Valentin A.; Petrov, Anatoly M.; Sedelnikov, Anatoly I.; Tikhonova, Tatyana S.; Polyakova, Nina P.; and Paklin, Sergei I., 4,966,756, Cl. 422-37.000.
Tilley, Scott W.: *See*—
Gretz, Bruce D.; and Tilley, Scott W., 4,967,126, Cl. 318-568.190.
Tilt Limitation Control: *See*—
Lund, Mark A.; and Garrabrant, Genevieve, 4,966,390, Cl. 280-772.000.
Tinnes, Bernhard; and Vetterli, Walter, to Metacon AG. Refractory plate assembly for a three-plate sliding closure unit. 4,966,315, Cl. 222-600.000.
Tissot, Patrick; Guy, Jean; and Patel, Claude, to Tissot, S.A. Cover for a toilet bowl. 4,965,889, Cl. 4-234.000.
Tissot, S.A.: *See*—
Tissot, Patrick; Guy, Jean; and Patel, Claude, 4,965,889, Cl. 4-234.000.
Titanium Metals Corporation of America (TIMET): *See*—
Wardlaw, Tommie L.; and Bania, Paul J., 4,966,816, Cl. 428-552.000.
Tjurin, Jury I.: *See*—
Slez, Leonid G.; and Tjurin, Jury I., 4,966,326, Cl. 239-99.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Takai, Haruko; Sakiyama, Taiji; Matsuzaki, Kimishige; Nozaki, Toshio; Okumura, Yoshiharu; and Imai, Chihiro, 4,966,981, Cl. 549-215.000.
Toda, Masatoshi: *See*—
Okada, Hiroshi; Toda, Masatoshi; Suzuki, Shingo; Kagami, Manabu; and Komiya, Masayoshi, 4,966,432, Cl. 350-96.150.
Tokugawa, Osamu, to Nippon Seiko Kabushiki Kaisha. Buckle stalk for seat belt system. 4,966,393, Cl. 280-801.000.
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, to Mitsubishi Gas Chemical Co., Inc. Process for decomposing aromatic acylated compound.HF-BF_3 complex. 4,967,011, Cl. 568-325.000.
Tokyo Automatic Machinery Works, Ltd.: *See*—
Masubuchi, Norio; and Akiyama, Heiemon, 4,965,985, Cl. 53-479.000.
Tokyo Electric Power Company, The: *See*—
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Ohoshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Tokyo Electron Limited: *See*—
Yokota, Keiichi; and Takebuchi, Ryuichi, 4,966,520, Cl. 414-786.000.
Tolivaisa, John: *See*—
Settlemier, Brock R.; Bone, Steven R.; Tolivaisa, John; and Nugent, James E., 4,965,922, Cl. 29-426.400.
Tolman, Richard L.; and MacCoss, Malcolm, to Merck & Co. Inc. Cyclic monophosphates of purine and pyrimidine acyclonucleosides as anti-retroviral agents. 4,966,895, Cl. 514-81.000.
Tomaschek, Heinz A.; and Perlik, Helmuth, to Dinol International Aktiebolag. Plastisol composition. 4,966,936, Cl. 524-425.000.
Tominaga, Shinji: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.
Tomita, Junko: *See*—
Manabe, Yoshiharu; Tomita, Junko; and Shinozaki, Atsushi, 4,967,212, Cl. 346-160.000.
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, to Mitsui Petrochemical Ind., Ltd.; and NEC Environment Engineering, Ltd. Composition having damping property, damping member, process for preparation of damping member and method of using damping member. 4,966,929, Cl. 524-71.000.
Toporkiewicz, Marian, to Imax Systems Corporation. 3-D motion picture projector. 4,966,454, Cl. 352-59.000.
Toray Industries, Inc.: *See*—
Kawakami, Ken-ichi; Murakami, Masatsugi; and Takuwa, Kenji, 4,966,933, Cl. 524-310.000.
Torkelson, Robert: *See*—
Dechambeau, Scott A.; Torkelson, Robert; and Thompson, David, 4,966,217, Cl. 160-35.000.
Torok, Vilmos; and Loreth, Andrzej, to Astra-Vent AB. Air transporting arrangement. 4,967,119, Cl. 315-111.910.

Torreno, Manuel L., Jr.: *See*—
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey E., 4,966,865, Cl. 437-192.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Taguchi, Masaru; Kuroki, Yasuhiro; Uchida, Yoshiharu; and Kawano, Saburo, 4,966,540, Cl. 425-208.000.

Touchton, James J.; and Baumann, Todd D., to MiniScribe Corporation. Method and apparatus for preventing an over-velocity error condition of a hard disk drive system. 4,967,291, Cl. 360-78.040.

Tower, Stephen N.; Veronesi, Luciano; and Braun, Howard E., to Westinghouse Electric Corp. Hydro-ball in-core instrumentation system and method of operation. 4,966,747, Cl. 376-254.000.

Towers, Christine M.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,085, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,967,087, Cl. 250-483.100.

Towers, Kenneth S.: *See*—
Thomas, Rudy V.; and Towers, Kenneth S., 4,966,294, Cl. 280-807.000.

Townsend Engineering Company: *See*—
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,965,910, Cl. 17-49.000.

Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., to Townsend Engineering Company. Encased product and method and apparatus for encasing same. 4,965,910, Cl. 17-49.000.

Toyo Boseki Kabushiki Kaisha: *See*—
Fujita, Takayoshi; Nishinaka, Hisao; Ohota, Michio; Dammoto, Yoshihisa; and Nagira, Shigeo, 4,965,919, Cl. 28-220.000.

Toyoda Koki Kabushiki Kaisha: *See*—
Asano, Hiroaki; Haga, Kyosuke; and Ito, Isao, 4,966,268, Cl. 192-58.00C.

Toyota Jidosha Kabushiki Kaisha: *See*—
Asano, Hiroaki; Haga, Kyosuke; and Ito, Isao, 4,966,268, Cl. 192-58.00C.
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.
Ishiguro, Yasuo; Kato, Yoshito; Hayashi, Chisao; Nakano, Masaru; Koide, Mitsuo; Moribe, Hiroshi; and Kuno, Toshitaka, 4,967,127, Cl. 318-571.000.
Iwasaki, Takashi; and Shimomura, Hiroshi, 4,966,385, Cl. 280-698.000.
Iwatsuki, Kunihiro; and Taniguchi, Hiroji, 4,967,355, Cl. 364-424.100.
Kaede, Hiroshi; Koike, Tadahiro; Kato, Shinji; Maeda, Yorishige; Fuwa, Yoshio; Sugimoto, Shigetoshi; Aoyagi, Hikaru; and Shibata, Shinzi, 4,966,751, Cl. 420-34.000.
Mitsuyasu, Masaki; and Tsuzuki, Naoyuki, 4,966,119, Cl. 123-498.000.

Tradatlantex AG: *See*—
Colsen, Ronnie; Kairis, Alexander; and Deller, Andrew L., 4,966,164, Cl. 128-789.000.

TranSwitch Corporation: *See*—
Upp, Daniel C.; and Cochran, William T., 4,967,405, Cl. 370-1.000.

Trantham, Richardson J.: *See*—
Rush, James B.; Bryan, James S.; Henry, Pearison W.; and Trantham, Richardson J., 4,966,741, Cl. 264-154.000.

Tremaine, Shawn A.; and De La Rosa, Loren M. Vehicular windshield cover. 4,966,405, Cl. 296-95.100.

Trigg, Richard D., to Standard Oil Company, The. Method and apparatus for column flotation of mineral matter. 4,966,687, Cl. 209-164.000.

Triggs, William M.: *See*—
Hillman, Joseph T.; Price, J. B.; and Triggs, William M., 4,966,869, Cl. 437-200.000.

Trozzi, Norman K., to Foster Wheeler Energy Corporation. Trunnion bearing dust seal. 4,966,471, Cl. 384-151.000.

Trukenbrod, Karl: *See*—
Takahashi, Hideyuki; Suzuki, Shohei; Takahama, Tomohiko; Aoki, Tadamichi; Higaki, Yoshikazu; and Trukenbrod, Karl, 4,967,027, Cl. 585-5.000.

Trutzschler GmbH & Co. KG: *See*—
Kluttermann, Jurgen; and Mosges, Helmut P., 4,965,912, Cl. 19-159.00R.

TRW Steering & Industrial Products Co., Ltd.: *See*—
Umeda, Hirotaka, 4,966,192, Cl. 137-625.230.

Tsai-Chuan, Lu. Adjustable tire chain. 4,966,211, Cl. 152-225.00R.

Tsuchida, Masashi: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.

Tsuchiya, Osamu: *See*—
Kajigaya, Kazuhiko; and Tsuchiya, Osamu, 4,967,396, Cl. 365-207.000.

Tsuchiya, Yoshimi; Hayashi, Masahiro; Takehana, Hiroshi; Hisaka, Akihiro; Sawasaki, Yoshio; and Ihara, Masaki, to Banyu Pharmaceutical Co., Ltd. L-dopa derivatives or their acid addition salts, process for producing same and their use. 4,966,915, Cl. 514-531.000.

Tsuchiya, Yutaka: *See*—
Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,967,144, Cl. 324-96.000.

Tsuji, Mitsuji; Usuda, Eiichi; and Aoshima, Masashi, to Sumitomo Chemical Company, Limited. Vulcanized, ethylene/alpha-olefin copolymer rubber composition. 4,966,940, Cl. 525-66.000.

Tsujimura, Osamu; Arai, Tatsuo; and Saito, Takayoshi, to Mitsubishi Kinzoku Kabushiki Kaisha. Face milling cutter with cutter inserts. 4,966,500, Cl. 407-34.000.

Tsukada, Tokio: *See*—
Shinnai, Masao; Nishikawa, Kazuya; Tsukada, Tokio; and Hirotsu, Tohru, 4,967,202, Cl. 343-713.000.

Tsukamoto, Takashi: *See*—
Keida, Haruo; Tsukamoto, Takashi; and Nagasaki, Nobutaka, 4,967,352, Cl. 364-200.000.

Tsukamoto, Yashuhiro, to Izumi Corporation. Apparatus and method for passing a continuous conduit through a rotatable member. 4,966,554, Cl. 439-15.000.

Tsukao, Toshiya: *See*—
Akamatsu, Norio; and Tsukao, Toshiya, 4,967,105, Cl. 307-448.000.

Tsukimura, Kiyoshi: *See*—
Seki, Yasunari; Koike, Yuzuru; Tachibana, Yosuke; and Tsukimura, Kiyoshi, 4,966,110, Cl. 123-327.000.

Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, to Onada Cement Co., Ltd; and Onada Alc Co., Ltd. Hot forming mold and method of manufacturing the same. 4,966,629, Cl. 106-38.270.

Tsumoto, Takamasa: *See*—
Agou, Tokinori; Matsuzaki, Hitomi; Tanaka, Masahide; Tsumoto, Takamasa; Kawasaki, Masaaki; Nishikawa, Takami; and Minami, Shuji, 4,966,813, Cl. 428-421.000.

Tsuneki, Hideaki: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.

Tsushima, Hideaki: *See*—
Endo, Terumasa; Naruse, Hiroshi; Nagaya, Hideo; Tsushima, Hideaki; Koyama, Isamu; and Matsumoto, Yoji, 4,966,384, Cl. 280-688.000.

Tsushima, Hiroaki: *See*—
Ezawa, Hiroshi; Watanabe, Takayuki; Tsushima, Hiroaki; and Nishiba, Zyuzo, 4,966,805, Cl. 428-212.000.

Tsuta, Kaoru: *See*—
Shikinami, Yasuo; Tsuta, Kaoru; Taniguchi, Masahiko; and Boutani, Hidekazu, 4,966,953, Cl. 528-60.000.

Tsutsumi, Koichi: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.

Tsutsumitake, Hideyuki: *See*—
Muragana, Tetsuro; and Tsutsumitake, Hideyuki, 4,967,371, Cl. 364-513.000.

Tsuzuki, Masanori: *See*—
Sato, Haruhito; and Tsuzuki, Masanori, 4,966,969, Cl. 544-352.000.

Tsuzuki, Naoyuki: *See*—
Mitsuyasu, Masaki; and Tsuzuki, Naoyuki, 4,966,119, Cl. 123-498.000.

Tsuzuki, Ryuji: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,966,904, Cl. 514-301.000.

Tucker, Gareth: *See*—
Halliday, Pieter S.; Tucker, Gareth; Lubbe, Carl H.; Harris, Alan J.; and Russell, David G., 4,966,077, Cl. 102-313.000.

Tuckett, Phillip C.: *See*—
Kalnins, Charles M.; Tuckett, Phillip C.; and Hansen, Soren R. Z., 4,966,703, Cl. 210-512.100.

Tuhro, Richard H.: *See*—
Bares, Jan; and Tuhro, Richard H., 4,967,238, Cl. 355-296.000.

Tune, Shearer E. Apparatus for rotating a vehicle through ninety degrees. 4,966,517, Cl. 414-678.000.

Turak, Ali A.: *See*—
Pawlak, Wanda; Janiak, Jerzy S.; Turak, Ali A.; and Ignasiak, Boleslaw L., 4,966,608, Cl. 44-624.000.

Turbanti, Luigi; and Garzelli, Giorgio, to Laboratori Guidotti SpA. Process for preparation of 3-hydroxy-3-methyl-glutaric acid. 4,966,993, Cl. 562-540.000.

Turk, Nathan: *See*—
Anello, Salvatore; and Turk, Nathan, 4,966,325, Cl. 232-57.500.

Turkki, Pekka, to Valmet Paper Machinery, Inc. Method for attaching a label to a surface of a package. 4,966,643, Cl. 156-215.000.

Turnbull, Andrew A.: *See*—
Cooke, Martin E.; and Turnbull, Andrew A., 4,967,082, Cl. 250-338.300.

Turner, John J.; and Turner, Mary J. A., to National Research Development Corporation. Oral feeding appliance. 4,966,580, Cl. 604-67.000.

Turner, Mary J. A.: *See*—
Turner, John J.; and Turner, Mary J. A., 4,966,580, Cl. 604-67.000.

Tweco Products: *See*—
Raney, Ty A.; and Bervig, Dale R., 4,967,055, Cl. 219-121.500.

Tychonievich, Louis P.: *See*—
Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., 4,967,368, Cl. 364-513.000.

Uang, Chiou-Luh. Pencil sharpener. 4,966,208, Cl. 144-28.720.

Ube Industries, Ltd.: *See*—
Hirosawa, Kouzou; and Kanazawa, Yukio, 4,966,714, Cl. 210-708.000.
Maeda, Sadahiko; Idei, Yasumasa; and Matsurra, Shinji, 4,966,101, Cl. 122-4.00D.
Mihara, Takeshi, 4,966,223, Cl. 164-305.000.

Ubels, John L.: *See*—
Gressel, Philip D.; Roehrs, Robert E.; Ubels, John L.; and Edelhauser, Henry F., 4,966,773, Cl. 424-489.000.

Uchida, Akito; and Sakaguchi, Iwao, to Kabushiki Kaisha Nagano Keiki Seisakusho. Vacuum pump with rotational sliding piston support. 4,966,533, Cl. 417-413.000.

Uchida, Junichi: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Uchida, Yoshiharu: *See*—
Taguchi, Masaru; Kuroki, Yasuhiro; Uchida, Yoshiharu; and Kawano, Saburo, 4,966,540, Cl. 425-208.000.

Uchikubo, Akinobu: *See*—
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Uchiyama, Takashi; Homma, Yuji; Sakamoto, Tetsuya; Horiguchi, Satoru; Mizuno, Mikizo; and Obata, Hiroyuki, to Dai Nippon Insatsu Kabushiki Kaisha. Multicolor sublimation type thermal recording method including color and gradation correction and device therefor. 4,967,283, Cl. 358-296.000.

Uchiyama, Yoshitaka: *See*—
Kobayashi, Takashi; Suzuki, Eiji; and Uchiyama, Yoshitaka, 4,967,030, Cl. 73-7.000.

Uddeholm Tooling Aktiebolag: *See*—
Johansson, Bertil; and Hasselstrom, Per, 4,966,818, Cl. 482-558.000.

Ueda, Atsushi: *See*—
Komurasaki, Satoshi; and Ueda, Atsushi, 4,967,114, Cl. 310-329.000.

Ueda, Hiroshi: *See*—
Taniguchi, Nobuyuki; Hoda, Takeo; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; and Ueda, Hiroshi, 4,967,214, Cl. 354-79.000.
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.

Ueda, Hirotada: *See*—
Kodama, Kazuyuki; Ueda, Hirotada; Keneko, Kenji; Hagiwara, Yoshimune; and Matsushima, Hitoshi, 4,967,349, Cl. 364-200.000.

Ueda, Shinji: *See*—
Ishikawa, Takatoshi; and Ueda, Shinji, 4,966,834, Cl. 430-393.000.

Uehara, Masao: *See*—
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.

Uehara, Tsutomu: *See*—
Hosoya, Masahiro; Sato, Shuitsu; Saito, Mitsunaga; Uehara, Tsutomu; Endo, Mitsuharu; and Futamata, Yukio, 4,967,231, Cl. 355-219.000.

Ueki, Toshiyuki: *See*—
Kohno, Keiichi; Miura, Hiroshi; Hirakawa, Yoshiyuki; Ueki, Toshiyuki; and Morikuni, Seiichi, 4,966,899, Cl. 514-197.000.

Ueno, Ryuzo; Masada, Yoshiyasu; Kuwae, Yoshihiko; and Kawata, Keiji, to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo. Process for production of aromatic hydroxycarboxylic acid. 4,966,992, Cl. 562-424.000.

Ueshima, Michio: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.

Ulich, Bobby L.; Keeler, R. Norris; and Phlibsen, Kent, to Kaman Aerospace Corporation. Lidar system incorporating multiple cameras for obtaining a plurality of subimages. 4,967,270, Cl. 358-95.000.

Ultra-Probe: *See*—
Patterson, Joseph M., 4,967,152, Cl. 324-158.00R.

Umeda, Hirotaka, to TRW Steering & Industrial Products Co., Ltd. Rotary directional control valve. 4,966,192, Cl. 137-625.230.

Umeda, Isao: *See*—
Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, 4,966,891, Cl. 514-49.000.

Umemura, Kazuo: *See*—
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.

Umezawa, Yujiro: *See*—
Kawasaki, Kiyohito; Umezawa, Yujiro; and Sugawara, Toshio, 4,966,216, Cl. 152-556.000.

Umezu, Naoaki: *See*—
Katsuma, Takashi; Mori, Hideo; Shimaohgi, Toshio; and Umezu, Naoaki, 4,967,120, Cl. 315-382.000.

Unilever Patent Holdings: *See*—
Nylander, Claes I.; and Burns, Ian W., 4,966,671, Cl. 204-153.140.

Unilever Patent Holdings B.V.: *See*—
Verrips, Cornelis T.; Maat, Jan; Edens, Luppo; and Ledeboer, Adrianus M., 4,966,842, Cl. 435-69.100.

Union Camp Corporation: *See*—
Avni, Eitan; and Pace, Sal A., 4,966,455, Cl. 356-73.000.

Union Carbide Chemicals and Plastics Company Inc.: *See*—
Soo, Hwaili; Ream, Bernard C.; and Robson, John H., 4,967,018, Cl. 568-867.000.

Union Oil Company of California: *See*—
Harbolt, Bruce; and Saake, James T., 4,966,736, Cl. 264-11.000.
Kissell, Charles L.; Selover, Jay C.; and Ingle, David M., 4,966,791, Cl. 427-389.900.
Withrow, Shelby M., 4,966,619, Cl. 65-348.000.
Young, Donald C., 4,966,620, Cl. 71-83.000.

Uniroyal Chemical Company, Inc.: *See*—
Lai, Hoi K.; and Davis, Robert A., 4,966,910, Cl. 514-383.000.
Relyea, Douglas I.; Regia, Richard R.; and Davis, Robert A., 4,966,912, Cl. 514-397.000.

Uniroyal Chemical Ltd./Ltee: *See*—
Lai, Hoi K.; and Davis, Robert A., 4,966,910, Cl. 514-383.000.

Uniroyal Plastics Co., Inc.: *See*—
Callinan, Kevin M.; and Enniss, James P., 4,966,609, Cl. 51-295.000.

Unisys Corporation: *See*—
Walck, Jeffrey A., 4,967,397, Cl. 365-222.000.

United States of America
Agriculture: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.
Stack, Robert J., 4,966,845, Cl. 435-105.000.
Air Force: *See*—
Watson, Steven M., 4,967,077, Cl. 250-237.00R.
Army: *See*—
Lebsock, Robert A., 4,967,123, Cl. 318-490.000.
Neifeld, Richard A., 4,967,167, Cl. 332-144.000.
Energy: *See*—
Ashley, Carol S.; and Reed, Scott T., 4,966,812, Cl. 428-412.000.
Bullock, R. Morris, 4,967,031, Cl. 585-250.000.
Novick, Vincent J., 4,966,462, Cl. 356-437.000.
Sanchez, John A.; Roemer, Edward L.; and Stretz, Lawrence A., 4,967,000, Cl. 564-242.000.
Skinner, Nathan L., 4,966,763, Cl. 423-491.000.
Williams, Joel M., Jr.; Nyitray, Alice M.; and Wilkerson, Mark H., 4,966,919, Cl. 521-54.000.
Health and Human Services: *See*—
Feldman, Alfred P., 4,967,372, Cl. 364-518.000.
Interior: *See*—
Swanson, David E.; and Schlumpberger, Michael X., 4,966,237, Cl. 166-292.000.
National Aeronautics and Space Administration: *See*—
Bugga, Ratnakumar V.; DiStefano, Salvador; Williams, Roger M.; and Bankston, Clyde P., 4,966,823, Cl. 429-104.000.
Navy: *See*—
Castelli, Vincent J.; and Yeager, William L., 4,966,925, Cl. 523-177.000.
Esterowitz, Leon; and Allen, Roger E., 4,967,416, Cl. 372-6.000.
Humphrey, Samuel A., 4,966,079, Cl. 102-411.000.
Kietzer, James E., 4,967,163, Cl. 330-86.000.
Swiatosz, Edmund, 4,966,139, Cl. 128-205.230.

U.S. Philips Corp.: *See*—
Cooke, Martin E.; and Turnbull, Andrew A., 4,967,082, Cl. 250-338.300.
Dikken, Jan; and Salters, Roelof H. W., 4,967,103, Cl. 307-296.500.
Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., 4,967,140, Cl. 323-315.000.
Klos-Hein, Karl; and Rumpf, Horst H., 4,967,036, Cl. 74-54.000.
Sari, Hikmet, 4,967,164, Cl. 330-149.000.
Sauerwald, Wilhelm A.; Osseyran, Anwar; Eerenstein, Lars A. R.; and De Jong, Franciscus G. M., 4,967,142, Cl. 324-73.100.
Van Geelen, Andreas N.; Peelen, Jan G. J.; and Venhuizen, Hendrik, 4,966,614, Cl. 65-3.120.
Vogel, Willem J., 4,967,275, Cl. 358-183.000.

United Technologies Corporation: *See*—
Amelio, Armand F.; and Fischer, William C., Jr., 4,966,526, Cl. 416-90.00R.
Senterfitt, Donald R.; Mullaly, James R.; Hamner, Larry D.; Khan, Abdus S.; and Smeggil, John G., 4,966,229, Cl. 165-41.000.

Universal manufacturing: *See*—
Fahrbach, Rudolf, 4,966,337, Cl. 242-7.090.

University of British Columbia, The: *See*—
Durance, Timothy; Li-Chan, Eunice; and Nakai, Shuryo, 4,966,851, Cl. 435-206.000.

University of Michigan, The: *See*—
Rich, Arthur; Conti, Ralph S.; and Agranoff, Bernard W., 4,967,084, Cl. 250-361.00R.

University of Strathclyde, The: *See*—
Jackson, John, 4,966,155, Cl. 128-671.000.

University of Washington, The Board of Regents of the: *See*—
Riley, Donald E., 4,966,841, Cl. 435-69.100.

Upp, Daniel C.; and Cochran, William T., to TranSwitch Corporation. System for cross-connecting high speed digital SONET signals. 4,967,405, Cl. 370-1.000.

Urabe, Motohmi: *See*—
Takasuga, Shunzo; Sugimoto, Yukihiro; Noguchi, Keiichiro; and Urabe, Motohmi, 4,966,221, Cl. 164-120.000.

Urakami, Tatsuhiro: *See*—
Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; Urakami, Tatsuhiro; and Yamaguchi, Akihiro, 4,966,961, Cl. 528-345.000.

Urakami, Tsuneyuki; and Takiguchi, Yoshihiro, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for measuring the temporal correlation of fundamental particles. 4,967,080, Cl. 250-336.100.

Urano, Yoshiaki: *See*—
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, 4,966,712, Cl. 210-705.000.

Urataki, Etsuo; Kodama, Masaroshi; and Matsuno, Hiromitsu, to Hitachi, Ltd. Negative glow discharge lamp. 4,967,118, Cl. 315-56.000.

Uresil Corporation: *See*—
Jaron, Michael; and Melinyshyn, Lev, 4,966,197, Cl. 137-846.000.

Ushikubo, Takashi: *See*—
Wada, Keisuke; Onuma, Kazuhiko; Ushikubo, Takashi; and Ito, Tsuyoshi, 4,966,966, Cl. 536-119.000.

Usuda, Eiichi: *See*—
Tsuji, Mitsuji; Usuda, Eiichi; and Aoshima, Masashi, 4,966,940, Cl. 525-66.000.

Utah Medical Products: *See*—
Wallace, William D.; and Cutler, Christopher A., 4,966,161, Cl. 128-748.000.

Utility Structural Systems: *See*—
Kirby, Norman R., 4,966,497, Cl. 405-232.000.

Utlaut, Mark W.: *See*—
Clark, William M., Jr.; Walden, Robert H.; and Utlaut, Mark W., 4,967,250, Cl. 357-24.000.

Vaillancourt, Vincent L. Closed system over-the-needle I.V. catheter. 4,966,586, Cl. 604-164.000.

Vaille, Francois: *See*—
Viaud, Andre ; and Vaille, Francois, 4,967,040, Cl. 174-36.000.

Valenta, Jiri: *See*—
Hampl, Jan; Taraba, Oldrich; and Valenta, Jiri, 4,967,365, Cl. 364-474.150.

Valeo: *See*—
Andrieux, Raymond; Hom, Pierre; and Laseneur, Patrick, 4,967,111, Cl. 310-90.000.

Vallee, Bert L.; and Kurachi, Kotoku, to President and Fellows of Harvard College. CDNA and genes for human angiogenin (angiogenesis factor) and methods of expression. 4,966,849, Cl. 435-199.000.

Vallee, Bert L.: *See*—
Shapiro, Robert; and Vallee, Bert L., 4,966,964, Cl. 536-27.000.

Vallejo, Jose L. R.: *See*—
Andreu, Enrique M.; Gomez, Fernando N.; Vallejo, Jose L. R.; and Ostariz, Jose L. S., 4,966,956, Cl. 528-185.000.

Valmet Paper Machinery, Inc.: *See*—
Turkki, Pekka, 4,966,643, Cl. 156-215.000.

Valois: *See*—
Lina, Jean-Pierre; and Di Giovanni, Patrick, 4,966,535, Cl. 417-553.000.

van der Hoeven, Martin A. Muscular development method. 4,966,363, Cl. 272-93.000.

van der Meer, Roelof: *See*—
Bussink, Jan; and van der Meer, Roelof, 4,966,943, Cl. 525-68.000.

Van Geelen, Andreas N.; Peelen, Jan G. J.; and Venhuizen, Hendrik, to U.S. Philips Corp. Method of and device for manufacturing optical fibers. 4,966,614, Cl. 65-3.120.

VanLeer, Paul W.: *See*—
Brenner, Larry B.; and VanLeer, Paul W., 4,967,353, Cl. 364-200.000.

Van Niekerk, Daniel G. Load handling system. 4,966,515, Cl. 414-528.000.

Vaporless Manufacturing, Inc.: *See*—
Geisinger, Penrod C., 4,966,190, Cl. 137-613.000.

Varga, Ljubomir D.: *See*—
Losic, Novica A.; and Varga, Ljubomir D., 4,967,134, Cl. 318-802.000.

Varghese, Philip: *See*—
Marler, David O.; Sorensen, Charles M.; and Varghese, Philip, 4,967,020, Cl. 568-896.000.

Varian Associates, Inc.: *See*—
Szajnowski, Wieslaw J., 4,967,380, Cl. 364-550.000.

Vartanian Industries, Inc.: *See*—
Vartanian, Roger, 4,966,516, Cl. 414-537.000.

Vartanian, Roger, to Vartanian Industries, Inc. Vehicle access ramp having alternative pivots for stowing. 4,966,516, Cl. 414-537.000.

Vaught, John L.: *See*—
Berger, Josef; Neukermans, Armand P.; and Vaught, John L., 4,967,095, Cl. 250-572.000.

Veistinen, Mauri K., to Outokumpu Oy. Method for the treatment of metal objects. 4,966,668, Cl. 204-192.310.

Veit-Holger, Karl. Film blowing line with roll. 4,966,536, Cl. 425-72.100.

Venhuizen, Hendrik: *See*—
Van Geelen, Andreas N.; Peelen, Jan G. J.; and Venhuizen, Hendrik, 4,966,614, Cl. 65-3.120.

Vereinigte Aluminum-Werke AG: *See*—
Schatz, Wolfgang; and Schneider, Helmut, 4,966,819, Cl. 428-603.000.

Verge, Ramon M. V., to Mecanismos Auxiliares Industriales, S.A. Terminal assembling tool for connecting multiple terminated wires to a connector. 4,965,928, Cl. 29-742.000.

Veronesi, Luciano: *See*—
Tower, Stephen N.; Veronesi, Luciano; and Braun, Howard E., 4,966,747, Cl. 376-254.000.

Verrips, Cornelis T.; Maat, Jan; Edens, Luppo; and Ledeboer, Adrianus M., to Unilever Patent Holdings B.V. Structural genes encoding the various allelic and maturation forms of preprothaumatin recombinant cloning vehicles, comprising said structural genes and expression thereof in transformed microbial host cells. 4,966,842, Cl. 435-69.100.

Vershure, Roy W., Jr.; and Weber, Kent, to Sundstrand Corporation. Power unit with stored energy. 4,965,995, Cl. 60-39.142.

Vestergren, Rolf: *See*—
Liljenfeldt, Gosta; Rosgren, Carl-Erik; Sjoberg, Harry; and Vestergren, Rolf, 4,967,035, Cl. 73-116.000.

Vetterli, Walter: *See*—
Tinnes, Bernhard; and Vetterli, Walter, 4,966,315, Cl. 222-600.000.

Viaud, Andre ; and Vaille, Francois, to Societe Anonyme dite: FILOTEX. Screened electric cable provided with zones for rapid parallel connection. 4,967,040, Cl. 174-36.000.

VidCode, Inc.: *See*—
Greenberg, Burton, 4,967,273, Cl. 358-142.000.

Vinckx, Valery: *See*—
Ecalle, Olivier; and Vinckx, Valery, 4,966,632, Cl. 148-16.000.

Virtual Corporation: *See*—
Birck, Jonathan D.; and Garuts, Valdis E., 4,966,160, Cl. 128-746.000.

Viscodrive GmbH: *See*—
Wiese, Helmut; and Schonenbrucher, Paul-Erich, 4,966,265, Cl. 192-35.000.

Vitajet Industria E. Commercio Ltda: *See*—
Landau, Sergio, 4,966,581, Cl. 604-72.000.

Vitale, Sheila R. Paper holder for positioning undersized paper in a typewriter. 4,966,477, Cl. 400-522.000.

VLSI Technology, Inc.: *See*—
Piednoir, Jacques-Oliver, 4,967,367, Cl. 364-489.000.

Voest-Alpine Industrienlagenbau: *See*—
Scheurecker, Werner; Spannlang, Ronald; Kalmar, Istvan; Leutgob, Manfred; and Schertler, Armin, 4,966,349, Cl. 266-276.000.

Voest-Alpine Maschinenbau Gesellschaft m.b.H.: *See*—
Zitz, Alfred; Barnthaler, Franz; and Brandl, Erich, 4,966,417, Cl. 299-33.000.

Vogel, Willem J., to U.S. Philips Corporation. TV receiver having a RF signal splitter that supplies more signal energy to a first tuning circuit than to the second substantially according to the picture display ratio of the first and second TV programs. 4,967,275, Cl. 358-183.000.

von Bonin, Wulf: *See*—
Becker, Robert; Goldmann, Gerd; von Gizycki, Ulrich; and von Bonin, Wulf, 4,966,801, Cl. 428-113.000.

von der Crone, Jost, to Ciba-Geigy Corporation. Process for coloring high molecular weight organic material with pigments based on iminoisoindoline. 4,966,930, Cl. 524-83.000.

von Gizycki, Ulrich: *See*—
Becker, Robert; Goldmann, Gerd; von Gizycki, Ulrich; and von Bonin, Wulf, 4,966,801, Cl. 428-113.000.

Von Holdt, John W. Locking container connector system. 4,966,298, Cl. 220-23.400.

von Kaler, Roland L.; and Page, Rocky H., to Tecumseh Products Company. Transaxle. 4,966,574, Cl. 475-206.000.

von Stein, Walter, to Erwin Sick GmbH Optik-Elektronik. Scanner for the detection of bar codes on articles. 4,967,074, Cl. 250-236.000.

von Wedel, Karl. Grate cooler device for the heat treatment of bulk material. 4,966,548, Cl. 432-77.000.

Vos, Eddy: *See*—
Culshaw, Stephen; and Vos, Eddy, 4,966,724, Cl. 252-158.000.

W. R. Grace & Co.-Conn.: *See*—
Deutch, Alan H.; and David, Victor A., 4,966,846, Cl. 435-172.300.

W. Schneider & Co., AG Metallwarenfabrik: *See*—
Schneider, Walter, 4,966,424, Cl. 312-265.600.

WABCO Westinghouse Steuerungstechnik GmbH & Co.: *See*—
Meyer, Ernst-August, 4,966,196, Cl. 137-625.640.

Wada, Chiharu: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.

Wada, Keisuke; Onuma, Kazuhiko; Ushikubo, Takashi; and Ito, Tsuyoshi, to Mitsubishi Chemical Industries Limited. Process for preparing sucrose fatty acid esters. 4,966,966, Cl. 536-119.000.

Waddell, William J.; Marlowe, Carolyn; and Keeney, L. Douglas, to C. A. Blockers, Inc. Process for manufacturing cigarettes. 4,966,169, Cl. 131-31.000.

Wagner, Otto M.: *See*—
Ludwig, Thomas; Schettler, Helmut; Wagner, Otto M.; and Zuhlke, Rainer, 4,967,104, Cl. 307-443.000.

Wagner, Paul-Heinz: *See*—
Koppatsch, Wolfgang, 4,966,057, Cl. 81-469.000.

Wagner, Rudolf, to Rems-Werk Christian Foll und Sohne GmbH & Co. Electrical soldering gun with hinged soldering jaws heated by a single heating element. 4,967,059, Cl. 219-230.000.

Wagner, Thomas: *See*—
Buerk, Hermann; Wagner, Thomas; and Steinhauser, Michael, 4,966,664, Cl. 204-146.000.

Wah, Men-Shun. Valve body concerning the bathtub cold/hot water valve. 4,966,187, Cl. 137-454.500.

Wahlco, Inc.: *See*—
Krigmont, Henry V.; and Coe, Everett L., Jr., 4,966,610, Cl. 55-5.000.

Wakabayashi, Satoshi: *See*—
Ono, Yoichi; Fujii, Kunio; Hinata, Shoji; and Wakabayashi, Satoshi, 4,966,442, Cl. 350-339.00R.

Wakashima, Takashi: *See*—
Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 4,966,804, Cl. 428-203.000.

Waki, Masayoshi: *See*—
Katoh, Takahiro; Takeura, Tooru; Waki, Masayoshi; Hagiwara, Yoshiki; and Adachi, Kazuyoshi, 4,967,299, Cl. 360-121.000.

Walck, Jeffrey A., to Unisys Corporation. Dynamic RAM controller. 4,967,397, Cl. 365-222.000.
Walden, Robert H.: *See*—
Clark, William M., Jr.; Walden, Robert H.; and Utlaut, Mark W., 4,967,250, Cl. 357-24.000.
Walker, Richard N.: *See*—
Midlang, Brian M.; Kopf, Bruce A.; and Walker, Richard N., 4,966,004, Cl. 62-77.000.
Wallace, William D.; and Cutler, Christopher A., to Utah Medical Products. Apparatus for continuously measuring intracompartmental pressure within a body cavity. 4,966,161, Cl. 128-748.000.
Wallin, Anders: *See*—
Wallin, Sven E.; and Wallin, Anders, 4,965,965, Cl. 51-55.000.
Wallin, Sven E.; and Wallin, Anders. Grinding head for surfacing and polishing stone, marbles and other hard materials. 4,965,965, Cl. 51-55.000.
Walsh, Richard E.: *See*—
Ames, John; Lang, David J.; and Walsh, Richard E., 4,966,067, Cl. 92-150.000.
Waltersdorfer, Anna: *See*—
Schubert, Hans H.; Salbeck, Gerhard; Krause, Hans-Peter; Luders, Walter; Knauf, Werner; Waltersdorfer, Anna; and Kern, Manfred, 4,966,902, Cl. 514-277.000.
Waltonen, James R., to Waltonen Laboratories. Fluid energizing method and apparatus. 4,966,666, Cl. 204-164.000.
Waltonen Laboratories: *See*—
Waltonen, James R., 4,966,666, Cl. 204-164.000.
Wan, Chi-Meen, to Famcy Steel Corporation. Two-phase high damping capacity F3-Mn-Al-C based alloy. 4,966,636, Cl. 148-329.000.
Wang, Charles C. P.; and Smith, Patrick L., to Aerospace Corporation, The. Charge controlled adaptive-optics system. 4,967,063, Cl. 250-201.100.
Wang, Chin-Fu. Gas soldering iron. 4,966,128, Cl. 126-414.000.
Wang, Hsug-Fang. Pre-impact alarm apparatus. 4,967,180, Cl. 340-436.000.
Wang, Ko P. Flexible encoscope assembly. 4,966,162, Cl. 128-750.000.
Wang Laboratories, Inc.: *See*—
Bolling, Richard W.; Tychonievich, Louis P.; Margrave, Geoffrey E.; Shannon, David F.; and Rustici, Eric S., 4,967,368, Cl. 364-513.000.
Wang, Lawrence C. H.: *See*—
Pang, Peter K. T.; Wang, Lawrence C. H.; Benishin, Christina G.; and Liu, Hsing J., 4,966,893, Cl. 514-54.000.
Wang, Samuel S.; and Nagaraj, D. R., to American Cyanamid Company. Allyl thiourea polymer with surface-modifying agent. 4,966,938, Cl. 524-555.000.
Wang, Teh-Chuan, to Du Pont de Nemours, E. I., and Company. Oriented polymeric tape. 4,966,950, Cl. 525-444.000.
Wang, Ying: *See*—
Clement, Robert A.; Tam, Wilson; and Wang, Ying, 4,966,730, Cl. 252-589.000.
Wanha, Christopher D.: *See*—
Linke, Thomas A.; Livingston, Troy W.; Wanha, Christopher D.; and Shewey, Charles E., 4,966,538, Cl. 425-144.000.
Wardlaw, Tommie L.; and Bania, Paul J., to Titanium Metals Corporation of America (TIMET). Pack assembly for hot rolling. 4,966,816, Cl. 428-552.000.
Wardle, John W., to Woodward Governor Company. Multiplexed hydraulic control systems. 4,966,065, Cl. 91-361.000.
Waring, Donald A. Disposable oral liquid measure dispenser. 4,966,312, Cl. 222-209.000.
Wark, Rick; Christos, Philip H.; and Williamson, Karl M. Self-cleaning grate assembly. 4,966,689, Cl. 209-384.000.
Warner, Charles Y.; Strother, Charles E.; Struble, Donald E.; and Wille, Milton G., to Collision Safety Engineering Inc. Inflatable structures for side impact crash protection. 4,966,388, Cl. 280-730.000.
Warriner, Dirk: *See*—
Shepherd, Glen C.; Warriner, Dirk; and Starks, Charles F., 4,967,042, Cl. 174-250.000.
Washington Research Foundation: *See*—
Clark, John I.; Farr, Andrew G.; and Smith, Stacia A., 4,966,911, Cl. 514-385.000.
Washington University: *See*—
Wun, Tze-Chein; Kretzmer, Kuniko K.; and Broze, George J., Jr., 4,966,852, Cl. 435-235.000.
Wassel, Edward R.: *See*—
Ngai, Chuck H.; Wassel, Edward R.; and Watkins, Gerald J., 4,967,343, Cl. 364-200.000.
Wasser, Richard B., to American Cyanamid Company. Increasing the stiffness of paper. 4,966,652, Cl. 162-135.000.
Watanabe, Fumio: *See*—
Nishibayashi, Hideyuki; Urano, Yoshiaki; Matsuura, Nobuhiro; Hozumi, Yoshiyuki; and Watanabe, Fumio, 4,966,712, Cl. 210-705.000.
Watanabe, Hitosi; Takagishi, Ikuo; Kosaka, Toshinobu; and Kawabata, Katsuhiko, to Pentel Kabushiki Kaisha. Washing liquid cartridge for refill ink type writing instrument. 4,966,480, Cl. 401-134.000.
Watanabe, Kyoichi A.; and Koyama, Masao, to Sloan-Kettering Institute for Cancer Research. Derivatives of chryosphanol. 4,966,918, Cl. 514-656.000.
Watanabe, Mutsuo: *See*—
Tani, Tatsuo; Watanabe, Mutsuo; and Muramatsu, Shigeru, 4,967,234, Cl. 355-260.000.
Watanabe, Norio: *See*—
Kojima, Yoshitaka; Mebata, Akira; Chiba, Akihiko; Oboshima, Ryoichiro; Watanabe, Norio; and Hara, Yukiyoshi, 4,966,820, Cl. 428-622.000.
Watanabe, Takashi: *See*—
Tsukiyama, Koichi; Takahashi, Hideaki; Tsutsumi, Koichi; Watanabe, Takashi; Wada, Chiharu; Kunugiza, Keitaro; and Teramura, Satoshi, 4,966,629, Cl. 106-38.270.
Watanabe, Takayuki: *See*—
Ezawa, Hiroshi; Watanabe, Takayuki; Tsushima, Hiroaki; and Nishiba, Zyuzo, 4,966,805, Cl. 428-212.000.
Watanabe, Takeyuki: *See*—
Takeichi, Michifumi; Tani, Hisashi; Terada, Katsuyuki; Watanabe, Takeyuki; Okuno, Sumio; and Dogen, Masayuki, 4,966,082, Cl. 105-422.000.
Watanabe, Tetsuya: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Watanabe, Yasushi: *See*—
Suzuki, Shigeru; Ohshiro, Katsuhiko; and Watanabe, Yasushi, 4,966,531, Cl. 417-295.000.
Watanabe, Yohji; and Furuyama, Tohru, to Kabushiki Kaisha Toshiba. Dram with (i)VCC precharge and selectively operable limiting circuit. 4,967,395, Cl. 365-203.000.
Watarai, Shinichi: *See*—
Ohyabu, Keiji; Watarai, Shinichi; and Sano, Hideaki, 4,966,356, Cl. 271-9.000.
Watkins, Frank T., III: *See*—
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, 4,967,061, Cl. 219-438.000.
Watkins, Gerald J.: *See*—
Ngai, Chuck H.; Wassel, Edward R.; and Watkins, Gerald J., 4,967,343, Cl. 364-200.000.
Watkins-Johnson Company: *See*—
London, Christopher L., 4,965,967, Cl. 51-289.00S.
Watson, Paul B., to Hewlett-Packard Company. Short airline calibration standards and methods for error-corrected microwave network analysis. 4,967,173, Cl. 333-260.000.
Watson, Steven M., to United States of America, Air Force. Multiple aperture arrays for optical and radio frequency signals. 4,967,077, Cl. 250-237.00R.
Watson, W. Gary: *See*—
Cheskis, Harvey P.; Watson, W. Gary; and Sankaranarayanan, Ashok, 4,966,224, Cl. 164-429.000.
Weasler Engineering, Inc.: *See*—
Mayhew, Roger D., 4,966,488, Cl. 403-135.000.
Weaver, Jeffrey P.: *See*—
Speller, Thomas H., Sr.; Davern, John W.; Weaver, Jeffrey P.; and Andrews, Mark J., 4,966,323, Cl. 227-51.000.
Webb, Stuart C.; Lewis, Leland M.; and Morris-Thurgood, Jayne A. Rate-responsive pacemaker. 4,966,146, Cl. 128-419.0PG.
Weber, Jaroy, Jr.; Kloeckl, Terrance L.; Kast, Michael A.; Watkins, Frank T., III; and Chan, Anthony, to Sonne Medical, Inc. Heated basin. 4,967,061, Cl. 219-438.000.
Weber, Kent: *See*—
Vershure, Roy W., Jr.; and Weber, Kent, 4,965,995, Cl. 60-39.142.
Weber-Stephen Products Co.: *See*—
Stephen, James C.; Schlosser, Erich H.; and Leja, Andrzej, 4,966,125, Cl. 126-25.00R.
Weckerle, Wolfgang: *See*—
Deneke, Ulfert; Guthlein, Werner; Weckerle, Wolfgang; and Wielinger, Hans, 4,966,855, Cl. 436-66.000.
Wei, Chih-Shih: *See*—
Murali, Venkatesan; Wei, Chih-Shih; and Fraser, David B., 4,966,868, Cl. 437-193.000.
Weidel, Edgar, to Telefunken Systemtechnik GmbH. Semiconductor circuit. 4,966,430, Cl. 350-96.110.
Weinberg, John O.: *See*—
Wiens, John P.; Pollard, Mark W.; and Weinberg, John O., 4,967,296, Cl. 360-106.000.
Weinsdorfer, Helmut: *See*—
Artunc, Hulusi; Egbers, Gerhard; Weinsdorfer, Helmut; and Wolfrum, Jurgen, 4,965,916, Cl. 28-271.000.
Weinstein, Robert E.: *See*—
Lopez, Rudolph M.; Nix, James L.; and Weinstein, Robert E., 4,967,301, Cl. 360-128.000.
Weiss, Armin K.: *See*—
Mehra, Madhay; and Weiss, Armin K., 4,966,831, Cl. 430-321.000.
Welch, Michael T.; McMann, Ronald E.; Torreno, Manuel L., Jr.; Garcia, Evaristo, Jr.; and Brighton, Jeffrey E., to Texas Instruments Incorporated. Method for planarization of a semiconductor device prior to metallization. 4,966,865, Cl. 437-192.000.
Werdich, Anton, to Alois Kober KG. Torsion spring bar axle for vehicle trailers. 4,966,386, Cl. 280-700.000.
Werner, Christoph: *See*—
Risch, Lothar; Tielert, Reinhard; Mueller, Wolfgang; and Werner, Christoph, 4,966,859, Cl. 437-29.000.
Werner, Eberhard: *See*—
Willenbrock, Walter; and Werner, Eberhard, 4,966,274, Cl. 198-621.000.
Werner, Paul; and Hiernaut, Jean-Pol, to Europaische Atomgemeinschaft (EURATOM). Method and a device for manufacturing a powder of amorphous ceramic or metallic particles. 4,966,737, Cl. 264-14.000.

Werner, Ross G.; and Ryherd, Eric L., to Alliant Computer Systems Corporation. Drawing processor for computer graphic system using a plurality of parallel processors which each handle a group of display screen scanlines. 4,967,392, Cl. 364-900.000.
Wessa, Theo. Apparatus for the production of small clear ice bodies. 4,966,015, Cl. 62-347.000.
West Penn Plastics, Inc.: *See*—
Marino, Michael, 4,966,292, Cl. 215-256.000.
Westerhaus, Axel; Ganter, Karl-Werner; and Buxbaum, Gunter, to Bayer Aktiengesellschaft. Color intensive iron oxide black pigments obtained by the nitrobenzene reduction process and a process for its preparation. 4,966,641, Cl. 106-456.000.
Westernacher, Helmut; Aertken, Karl; and Stieren, Thomas, to Gaf-Huels Chemie GMBH. Method of manufacturing 2-propyn-1-ol. 4,967,019, Cl. 568-873.000.
Westfalia Separator AG: *See*—
Schulz, Dieter; Wrede, Ulrich; and Mackel, Wilfried, 4,966,576, Cl. 494-56.000.
Westinghouse Electric Company: *See*—
Widener, Wade H.; and Boatwright, David A., 4,966,745, Cl. 376-264.000.
Westinghouse Electric Corp.: *See*—
John, Clarence D., Jr.; Jarabak, Beverly T.; and Cigich, Joseph G., 4,966,177, Cl. 134-61.000.
Rich, Edward L., III, 4,967,201, Cl. 342-175.000.
Tower, Stephen N.; Veronesi, Luciano; and Braun, Howard E., 4,966,747, Cl. 376-254.000.
Wheelock, Inc.: *See*—
Nguyen, Luy B., 4,967,177, Cl. 340-326.000.
Wheland, Robert C., to Du Pont de Nemours, E. I., and Company. Process for increasing the molecular weight of a polyamide with p containing catalyst. 4,966,949, Cl. 525-420.000.
White, Alan W., to Eastman Kodak Company. Methods for improving feed utilization and lactation in ruminant animals. 4,966,917, Cl. 514-616.000.
White, Daniel R. Insulated panelized roofing system. 4,965,977, Cl. 52-410.000.
White, Thomas E., IV. Supplemental suspension system and method for supplementing the suspension system of a vehicle. 4,966,387, Cl. 280-712.000.
Whitekettle, Wilson K.: *See*—
Donofrio, Deborah K.; and Whitekettle, Wilson K., 4,966,775, Cl. 424-661.000.
Whitten, Ronald G., to Teleco Oilfield Services Inc. Method for determining the free point of a stuck drillstring. 4,966,234, Cl. 166-250.000.
Widener, Wade H.; and Boatwright, David A., to Westinghouse Electric Company. Fuel rod gripper end cap for minimizing impact with grid cell dimples. 4,966,745, Cl. 376-264.000.
Wielinger, Hans: *See*—
Deneke, Ulfert; Guthlein, Werner; Weckerle, Wolfgang; and Wielinger, Hans, 4,966,855, Cl. 436-66.000.
Wiens, John P.; Pollard, Mark W., and Weinberg, John O., to Seagate Technology, Inc. Lightweight, rigid, compact configuration for the voice coil, carriage and printed circuit cable in a disc drive. 4,967,296, Cl. 360-106.000.
Wiese, Helmut; and Schonenbrucher, Paul-Erich, to Viscodrive GmbH. Clutch. 4,966,265, Cl. 192-35.000.
Wilkerson, Mark H.: *See*—
Williams, Joel M., Jr.; Nyitray, Alice M.; and Wilkerson, Mark H., 4,966,919, Cl. 521-54.000.
Wilkerson, William M., Jr. Plastic covered solar still. 4,966,655, Cl. 202-234.000.
Wille, Milton G.: *See*—
Warner, Charles Y.; Strother, Charles E.; Struble, Donald E.; and Wille, Milton G., 4,966,388, Cl. 280-730.000.
Willenbrock, Walter; and Werner, Eberhard, to Eumuco Aktiengesellschaft fur Maschinenbau. Control system for a walking beam assembly of a forging press. 4,966,274, Cl. 198-621.000.
Willett, Paul E., to APV Baker Pty Ltd. Bread molders. 4,966,071, Cl. 99-450.100.
Williams, Joel M., Jr.; Nyitray, Alice M.; and Wilkerson, Mark H., to United States of America, Energy. Composite foams. 4,966,919, Cl. 521-54.000.
Williams, Roger M.: *See*—
Bugga, Ratnakumar V.; DiStefano, Salvador; Williams, Roger M.; and Bankston, Clyde P., 4,966,823, Cl. 429-104.000.
Williamson, Felton, Jr., to Master Pneumatic-Detroit, Inc. Pressure regulator. 4,966,183, Cl. 137-116.500.
Williamson, Karl M.: *See*—
Wark, Rick; Chrissos, Philip H.; and Williamson, Karl M., 4,966,689, Cl. 209-384.000.
Willis, Arthur C.: *See*—
Lent, Robert S.; Willis, Arthur C.; and Doran, Robert W., 4,967,342, Cl. 364-200.000.
Wilmes, Klaus: *See*—
Aichert, Hans; Gegenwart, Rainer; Kukla, Reiner; Wilmes, Klaus; and Kieser, Jorg, 4,966,677, Cl. 204-298.210.
Wilson Creek Placer Ltd.: *See*—
Sherman, Marvin, 4,966,686, Cl. 209-255.000.
Wilson, Harry. Method and apparatus for aligning a sawmill guide rail. 4,965,940, Cl. 33-651.100.
Winkler, Hans-Henning; Rutschle, Eugen; and Haninger, Rudolf, to Chiron-Werke GmbH & Co. KG. Machine tool. 4,966,505, Cl. 409-134.000.
Winston, Edith. Body exercise device. 4,966,365, Cl. 272-119.000.
Winter, Dean C.: *See*—
Perry, William D.; and Winter, Dean C., 4,966,156, Cl. 128-672.000.
Wirtgen, Reinhard. Front-loading cutting device for cutting up damaged road surfaces. 4,966,418, Cl. 299-39.000.
Wisconsin Alumni Research Foundation: *See*—
DeLuca, Hector F.; Kutner, Andrzej; and Schnoes, Heinrich K., 4,966,965, Cl. 536-27.000.
Wisner, Ronald R., to Tecumseh Products Company. Internal terminal block for compressor hermetic terminal. 4,966,559, Cl. 439-566.000.
Withrow, Shelby M., to Union Oil Company of California. Dead plate assembly. 4,966,619, Cl. 65-348.000.
Wittich, Kurt: *See*—
Kauss, Wolfgang; Muncke, Ludwig; Radtke, Dietrich; and Wittich, Kurt, 4,966,066, Cl. 91-516.000.
Wnukowski, Joseph T. Insulator installation tool. 4,965,930, Cl. 29-758.000.
Woersinger, Juergen, to Robert Bosch GmbH. Air flow rate meter. 4,966,036, Cl. 73-204.220.
Wolfe, Norman G.: *See*—
Godbey, E. Floyd, Jr.; Wolfe, Norman G.; and Zepka, David J., 4,966,948, Cl. 525-329.900.
Wolfe, William A.: *See*—
Marshall, Loren M.; and Wolfe, William A., 4,966,562, Cl. 439-718.000.
Wolfrum, Jurgen: *See*—
Artunc, Hulusi; Egbers, Gerhard; Weinsdorfer, Helmut; and Wolfrum, Jurgen, 4,965,916, Cl. 28-271.000.
Wolters, Clemens A. Internal combustion engine with fluid drive output. 4,966,000, Cl. 60-595.000.
Wong, Patrick S. L.: *See*—
Guittard, George V.; Wong, Patrick S. L.; Theeuwes, Felix; and Cortese, Richard, 4,966,769, Cl. 424-473.000.
Wood, Russell E., to Carrier Corporation. Method and apparatus for preventing compressor failure due to loss of lubricant. 4,966,013, Cl. 62-193.000.
Wooden, Gary: *See*—
Chodorge, Jeannine; Senet, Jean-Pierre; and Wooden, Gary, 4,966,995, Cl. 562-861.000.
Woods, Ernest C., Jr.; and Burnett, John B., to Zehntel, Inc. Circuit tester having mechanical fingers and pogo probes for causing electrical contact with test fixture assemblies. 4,967,147, Cl. 324-158.00F.
Woods, Theodore E., to Syntron, Inc. Digital marine seismic system. 4,967,400, Cl. 367-21.000.
Woodward Governor Company: *See*—
Wardle, John W., 4,966,065, Cl. 91-361.000.
Worley, Robert D. Precision multi-point linear positioning system. 4,966,209, Cl. 144-134.00A.
Wrede, Ulrich: *See*—
Schulz, Dieter; Wrede, Ulrich; and Mackel, Wilfried, 4,966,576, Cl. 494-56.000.
Wreede, John E.: *See*—
Moss, Gaylord E.; Wreede, John E.; and Yu, Kevin, 4,966,426, Cl. 350-3.700.
Wright, Fred L.: *See*—
Ackmann, Stephen A.; Beck, James R.; and Wright, Fred L., 4,966,623, Cl. 71-92.000.
Wright Line of Canada Ltd.: *See*—
Pfeffer, George; and Barber, Donald T., 4,966,639, Cl. 156-359.000.
Wright, Stanley H. B.: *See*—
Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., 4,966,907, Cl. 514-337.000.
Wu, Hsi-Liang. Ash-collecting pan and ventilation adjusting device for a barbecue set. 4,966,126, Cl. 126-25.00R.
Wu, Margaret M., to Mobil Oil Corporation. Liquid lubricants from alpha-olefin and styrene copolymers. 4,967,029, Cl. 585-12.000.
Wu, Margaret M.: *See*—
Ho, Suzzy C.; and Wu, Margaret M., 4,967,032, Cl. 585-255.000.
Wu, Wen-Pao, to Mobil Oil Corporation. Convective thermoforming oven. 4,966,546, Cl. 432-121.000.
Wun, Tze-Chein; Kretzmer, Kuniko K.; and Broze, George J., Jr., to Monsanto Company; and Washington University. DNA clone of human tissue factor inhibitor. 4,966,852, Cl. 435-235.000.
Wust, Rainer: *See*—
Rispeter, Siegfried; Muller, Hubert; and Wust, Rainer, 4,966,270, Cl. 192-87.150.
Xerox Corporation: *See*—
Bares, Jan; and Tuhro, Richard H., 4,967,238, Cl. 355-296.000.
Buchar, Wayne A.; Nau, Keith A.; and Lavallee, Pierre A., 4,967,233, Cl. 355-233.000.
Paine, Anthony J., 4,967,002, Cl. 564-307.000.
Rees, James D.; Lehman, Richard F.; and Ossman, Kenneth R., 4,967,265, Cl. 358-75.000.
Yagi, Takeshi; and Tamura, Toshio, to Fujitsu Limited. Subsignal transmitting system. 4,967,406, Cl. 370-16.000.
Yagihara, Morio: *See*—
Matushita, Tetunori; Yagihara, Morio; and Sakanoue, Kei, 4,966,835, Cl. 430-393.000.
Yaginuma, Nakatsugu: *See*—
Tanaka, Mitsutoshi; Arai, Fuminori; Terashima, Kaoru; and Yaginuma, Nakatsugu, 4,966,784, Cl. 427-2.000.
Yairo, Osamu: *See*—
Nakamura, Shigeo; and Yairo, Osamu, 4,967,101, Cl. 307-270.000.
Yamada, Atsushi, to Koito Manufacturing Co., Ltd. Display device for automotive mark plate. 4,965,950, Cl. 40-546.000.

Yamada, Etsuo, to Canon Kabushiki Kaisha. Laser driving device provided with two reference signal sources, and optical information recording apparatus using the same device. 4,967,417, Cl. 372-29.000.
Yamada, Minoru: *See*—
Sasaki, Ichiro; Oshima, Junji; and Yamada, Minoru, 4,966,942, Cl. 525-67.000.
Yamada, Shinjiro; and Satoh, Seiki, to Mitsui Kinzoku Kogyo Kabushiki Kaisha. Clutch for automobile door lock actuator. 4,966,266, Cl. 192-39.000.
Yamada, Takuma, to Dainippon Screen Mfg. Co., Ltd. Surface treatment method and apparatus therefor. 4,966,094, Cl. 118-698.000.
Yamaguchi, Akihiro: *See*—
Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; Urakami, Tatsuhiro; and Yamaguchi, Akihiro, 4,966,961, Cl. 528-345.000.
Yamaguchi, Hideki: *See*—
Terasawa, Koji; Okamoto, Hideaki; and Yamaguchi, Hideki, 4,967,204, Cl. 346-1.100.
Yamaguchi, Keizaburo: *See*—
Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; Urakami, Tatsuhiro; and Yamaguchi, Akihiro, 4,966,961, Cl. 528-345.000.
Yamaguchi, Kimiaki: *See*—
Maehara, Naoyoshi; Suenaga, Haruo; Sakamoto, Kazuho; Niwa, Takashi; Yamaguchi, Kimiaki; and Matsumoto, Takahiro, 4,967,051, Cl. 219-10.55B.
Yamaguchi, Satoshi: *See*—
Fukasawa, Yoshiharu; Yamaguchi, Satoshi; and Ishihara, Hideo, 4,966,676, Cl. 204-298.120.
Yamaguchi, Shinichiro: *See*—
Fukumaru, Hiroaki; Takaya, Soichi; Morioka, Takayuki; Bandoh, Tadaaki; Yamaguchi, Shinichiro; and Hirose, Kenji, 4,967,339, Cl. 364-200.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Yura, Takuya, 4,966,408, Cl. 296-185.000.
Yamakawa, Masami. Spherical photoelectric sensor. 4,967,069, Cl. 250-221.000.
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, to Hitachi, Ltd. Method and apparatus for processing data base. 4,967,341, Cl. 364-200.000.
Yamamoto, Koichi: *See*—
Kamei, Teruo; Shimasaki, Yuuji; Tsuneki, Hideaki; Yamamoto, Koichi; Morimoto, Yutaka; and Ueshima, Michio, 4,966,980, Cl. 548-954.000.
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, to Minolta Camera Kabushiki Kaisha. Camera system. 4,967,217, Cl. 354-173.110.
Yamamoto, Mitsuru: *See*—
Inoue, Noriyuki; Hirano, Shigeo; Kojima, Tetsuo; and Yamamoto, Mitsuru, 4,966,836, Cl. 430-598.000.
Yamamoto, Takashi, to Fuji Photo Film Co., Ltd. Photographic printer with a monitor. 4,967,266, Cl. 358-76.000.
Yamamoto, Takashi: *See*—
Matsumoto, Tsuruyoshi; Yamamoto, Takashi; Sugimori, Teruhiko; and Shimada, Katsuhiko, 4,966,435, Cl. 350-96.340.
Yamamoto, Yasuyoshi: *See*—
Tanaka, Toyoyasu; Yamamoto, Yasuyoshi; and Kaga, Yuzou, 4,965,904, Cl. 15-97.100.
Yamamoto, Yoshihiro: *See*—
Takaki, Usaji; Aoki, Shinobu; Yamamoto, Yoshihiro; and Hara, Isao, 4,966,977, Cl. 548-457.000.
Yamamoto, Yoshitaka: *See*—
Sato, Yoshiki; Yamamoto, Yoshitaka; Mito, Yutaka; and Tanabe, Harumasa, 4,966,978, Cl. 548-469.000.
Yamamura, Yasuharu: *See*—
Kondo, Shigeo; and Yamamura, Yasuharu, 4,966,749, Cl. 419-10.000.
Yamana Hatsudoki Kabushiki Kaisha: *See*—
Masuda, Yutaka, 4,966,247, Cl. 180-171.000.
Yamanaka, Akira: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,967,217, Cl. 354-173.110.
Yamanaka, Hiroshi: *See*—
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, 4,966,358, Cl. 271-10.000.
Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,966,904, Cl. 514-301.000.
Yamashita, Haruo: *See*—
Hashimoto, Yasuyuki; and Yamashita, Haruo, 4,966,483, Cl. 401-206.000.
Yamashita, Shinji: *See*—
Sasagawa, Katsuyoshi; Uehara, Masao; Uchikubo, Akinobu; Saito, Katsuyuki; Kanno, Masahide; Sasaki, Masahiko; Nakagawa, Takehiro; Hasegawa, Jun; and Yamashita, Shinji, 4,967,269, Cl. 358-98.000.
Yamashita, Tadakazu: *See*—
Kubo, Junichi; Kato, Kiyoshi; Yamashita, Tadakazu; Sato, Masaru; and Kato, Hiroshi, 4,966,679, Cl. 208-58.000.
Yamashita, Yoshiaki: *See*—
Yamamoto, Akira; Ohsone, Tadashi; Tsuchida, Masashi; Kitajima, Hiroyuki; Satoh, Kazuhiro; Yamashita, Yoshiaki; Taniguchi, Nobuhiro; Ohmachi, Kazuhiko; and Fukushima, Shinichi, 4,967,341, Cl. 364-200.000.
Yamashita, Yuji; Kobayashi, Koji; Shimizu, Keisuke; and Maekawa, Koji, to Hokkai Can Co., Ltd. Container with an easy open type closure. 4,966,301, Cl. 220-270.000.
Yamato Scale Company, Limited: *See*—
Hirano, Takashi; Taguchi, Michio; and Nishide, Kazuhiro, 4,967,383, Cl. 364-567.000.
Yamauchi, Shiro; Rito, Naotake; and Takahashi, Nobuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Humidity regulating apparatus for magnetic disk drive. 4,967,295, Cl. 360-97.020.
Yamauchi, Yutaka: *See*—
Okuyama, Takashi; and Yamauchi, Yutaka, 4,966,547, Cl. 432-9.000.
Yamazaki, Etuo; and Matsuura, Hitoshi, to Fanuc Ltd. Arbitrary-direction tracer control system. 4,967,364, Cl. 364-474.030.
Yamazaki, Masaya: *See*—
Ishii, Katsushi; and Yamazaki, Masaya, 4,966,009, Cl. 62-160.000.
Yamazaki, Mitsuki, to Kabushiki Kaisha Toshiba. Power heating member. 4,967,058, Cl. 219-221.000.
Yan, Tsoung Y.: *See*—
Landis, Michael E.; Pelrine, Bruce P.; and Yan, Tsoung Y., 4,967,030, Cl. 585-241.000.
Yanagawa, Tatsuhiko: *See*—
Tokura, Nobuyuki; Takefumi, Tadayoshi; Matsumoto, Shunichi; Yanagawa, Tatsuhiko; Shiokawa, Yoshihiro; and Ohtsuka, Ichiyo, 4,967,011, Cl. 568-325.000.
Yanagi, Kenichi: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.
Yaniv, Eitan. Method for the diagnosis of allergic rhinitis. 4,966,147, Cl. 128-630.000.
Yarita, Kenichi: *See*—
Miyazawa, Masashi; Kaneko, Toyokazu; Kaneko, Tetsuya; and Yarita, Kenichi, 4,966,994, Cl. 562-554.000.
Yasuda, Satoshi; Sakashita, Kiichiro; Mitsuhashi, Yasuo; Takagi, Seiichi; Aita, Shuichi; Nagai, Yoshinobu; and Nakahara, Toshiaki, to Canon Kabushiki Kaisha. Toner for developing electrostatic images, binder therefor and process for production thereof. 4,966,829, Cl. 430-109.000.
Yasuda, Yoshiteru: *See*—
Fujiki, Akira; Yasuda, Yoshiteru; Endo, Hiroyuki; Ikenoue, Yutaka; and Suzuki, Keitaro, 4,966,626, Cl. 75-238.000.
Yasunari, Kenjiro: *See*—
Shibasaki, Nobuo; Tanaka, Toshio; Nagayama, Yoshiharu; and Yasunari, Kenjiro, 4,967,387, Cl. 364-580.000.
Yatsu, Takeyuki: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,966,904, Cl. 514-301.000.
Yazaki Corporation: *See*—
Dohi, Hikoo, 4,966,565, Cl. 439-874.000.
Iino, Tadashi, 4,967,191, Cl. 340-705.000.
Iizuka, Tsutomu; and Ikegaya, Tatsuo, 4,967,181, Cl. 340-450.200.
Oikawa, Ryuetsu; Ikari, Akira; and Sasaki, Touru, 4,966,374, Cl. 277-178.000.
Yeager, William L.: *See*—
Castelli, Vincent J.; and Yeager, William L., 4,966,925, Cl. 523-177.000.
Yeda Research and Development Co., Ltd.: *See*—
Shanzer, Abraham; Libman, Jacqueline; and Lifson, Shneior, 4,966,997, Cl. 562-623.000.
Yee, Harold H.; and Hudson, James F., to Hughes Aircraft Company. Rotating coaxial switch. 4,967,174, Cl. 335-5.000.
Yokogawa Electric Corporation: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.
Yokogawa Medical Systems Limited: *See*—
Takeuchi, Yasuhito, 4,966,151, Cl. 128-660.050.
Yokoi, Takao, to Kabushiki Kaisha Shinkoseisakusho. Differential speed reduction apparatus and double-toothed gear for use therein. 4,966,573, Cl. 475-164.000.
Yokoi, Takeshi; Kuragairi, Hiroyasu; Nakamura, Shigeo; Kato, Tamotu; Umemura, Kazuo; and Yamanaka, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Apparatus for feeding recording medium, having means for easy handling of jamming trouble. 4,966,358, Cl. 271-10.000.
Yokose, Kazuteru: *See*—
Fujiu, Morio; Ishitsuka, Hideo; Miwa, Masanori; Umeda, Isao; and Yokose, Kazuteru, 4,966,891, Cl. 514-49.000.
Yokota, Keiichi; and Takebuchi, Ryuichi, to Tokyo Electron Limited. Method of positioning objects to be measured. 4,966,520, Cl. 414-786.000.
Yokota, Masaki: *See*—
Tanaka, Akihiro; Fujikura, Takashi; Tsuzuki, Ryuji; Yokota, Masaki; and Yatsu, Takeyuki, 4,966,904, Cl. 514-301.000.
Yokoyama, Keiichi: *See*—
Hashimoto, Isao; Yokoyama, Keiichi; and Kitahara, Takumi, 4,966,968, Cl. 544-176.000.
Yokoyama, Kenji: *See*—
Tomoshige, Toru; Fujii, Yasumasa; Suzuki, Youhei; Yokoyama, Kenji; and Iida, Yoshio, 4,966,929, Cl. 524-71.000.

Yokoyama, Sadayuki; and Nakagawa, Kaoru, to Kabushiki Kaisha Toshiba. Flash erasable and programmable nonvolatile semiconductor memory. 4,967,393, Cl. 365-185.000.

Yonechi, Shinichi; Ishida, Yukinori; and Kawase, Masaaki, to Sumitomo Electric Industries, Ltd.; and Nippon Telegraph and Telephone Public Corporation. Optical fiber cable. 4,966,434, Cl. 350-96.230.

Yoneda, Junkichi: *See*—
Seto, Hirohisa; Shibuya, Atsuyoshi; Uchida, Junichi; Nakamori, Toshio; Nakabayhashi, Hirotaka; Yanagi, Kenichi; Kanda, Yukio; Yoneda, Junkichi; Hidaka, Katsufumi; Shimozato, Yoshio; Furuzawa, Yuuji; Shimasaki, Hajime; and Taguchi, Toshio, 4,966,659, Cl. 204-28.000.

Yonushonis, Thomas M.: *See*—
Bentz, Joseph C.; Yonushonis, Thomas M.; Patten, James W.; and Fujimoto, Yuji, 4,966,108, Cl. 123-90.510.

Yoshida, Kazuhiro; and Tanaka, Yoshinori, to Hoshizaki Electric Company Ltd. Arrangement of ice fullness detector in ice making machine. 4,966,008, Cl. 62-137.000.

Yoshida, Masujiro: *See*—
Ichikawa, Mitsuhiko; Masuda, Bunpei; Tazoe, Nobuhiro; Yoshida, Masujiro; and Ide, Kenichi, 4,966,025, Cl. 72-184.000.

Yoshida, Takashi: *See*—
Harada, Kinji; Ikeda, Kyoichi; Kuwayama, Hideki; Kobayashi, Takashi; Nishikawa, Tadashi; Watanabe, Tetsuya; and Yoshida, Takashi, 4,966,649, Cl. 156-647.000.

Yoshida, Yoshiki; Asada, Kenichirou; and Nagaswa, Kiyoto, to Ricoh Company, Ltd. Image forming apparatus and method of controlling output of semiconductor laser. 4,967,284, Cl. 358-300.000.

Yoshimura, Masahiko: *See*—
Maeda, Akira; Yoshimura, Masahiko; and Hashimoto, Satoru, 4,967,350, Cl. 364-200.000.

Yoshioka, Kenji; and Ono, Yasuichi, to Alps Electric Co., Ltd. Encapsulated electroluminescence device. 4,967,117, Cl. 313-506.000.

Young, David A.; Jones, Larry O.; and Campione, Troy J., to Exxon Chemical Patents Inc. Process for preparing linear alpha-olefins using zirconium adducts as catalysts. 4,966,874, Cl. 502-117.000.

Young, Donald C., to Union Oil Company of California. Methods for facilitating the harvest of food crops. 4,966,620, Cl. 71-83.000.

Young, Lydia J., to Perkin Elmer Corporation, The. Method of creating isolated plates on the inside surface of a metallized substrate. 4,966,787, Cl. 427-106.000.

Young, Raymond W., to Amity Leather Products Co. Travel bag with multiple compartments. 4,966,260, Cl. 190-111.000.

Yu, Chung-Hsiung. Roller skate. 4,966,377, Cl. 280-11.200.

Yu, Ernest K. C.; Tan, Larry U. L.; and Saddler, John N., to Forintek Canada Corp. Production of thermostable xylanase and cellulase. 4,966,850, Cl. 435-200.000.

Yu, Kevin: *See*—
Moss, Gaylord E.; Wreede, John E.; and Yu, Kevin, 4,966,426, Cl. 350-3.700.

Yuen, Frank. Needle assembly. 4,966,591, Cl. 604-192.000.

Yuhasz, Frank U., to McNeil (Ohio) Corporation. Surge suppression system for submersible electrical motors. 4,967,303, Cl. 361-23.000.

Yukawa, Kimio: *See*—
Terai, Fumitaka; Yukawa, Kimio; and Suefuji, Mineo, 4,966,792, Cl. 427-358.000.

Yuki, Yoichi: *See*—
Hasegawa, Masaki; Saigo, Kazuhiko; Yuki, Yoichi; and Tachibana, Kouzou, 4,966,985, Cl. 556-116.000.

Yunokuchi, Ryu: *See*—
Okita, Masao; Omori, Shinichi; and Yunokuchi, Ryu, 4,967,297, Cl. 360-106.000.

Yura, Takuya, to Yamaha Hatsudoki Kabushiki Kaisha. Motor vehicle. 4,966,408, Cl. 296-185.000.

Yurchak, Sergei: *See*—
Avidan, Amos A.; and Yurchak, Sergei, 4,966,680, Cl. 208-71.000.

Zagorski, Gary A., to Rotation Dynamics Corporation. Electrostatic assist rotogravure printing safety contact. 4,966,555, Cl. 439-28.000.

Zagorski, Joseph; and Zagorski, Robin J. Holder for ski goggles. 4,966,322, Cl. 224-267.000.

Zagorski, Robin J.: *See*—
Zagorski, Joseph; and Zagorski, Robin J., 4,966,322, Cl. 224-267.000.

Zambias, Robert A.: *See*—
Caldwell, Charles G.; Hammond, Milton L.; Kopka, Ihor E.; Wright, Stanley H. B.; and Zambias, Robert A., 4,966,907, Cl. 514-337.000.

Zanetti, Franco. Device for the display of advertising material. 4,965,947, Cl. 40-471.000.

Zapp, Regie H.: *See*—
Haim, Roland L.; and Zapp, Regie H., 4,966,986, Cl. 556-473.000.

Zbornik, Vaclav, to Haemmerle AG. Method of bending a workpiece to a predetermined bending angle. 4,966,029, Cl. 72-379.200.

Zdeblick, Mark, to Leland Stanford University, Board of Trustees of. Method of making an integrated, microminiature electric to fluidic valve. 4,966,646, Cl. 156-633.000.

Zehntel, Inc.: *See*—
Woods, Ernest C., Jr.; and Burnett, John B., 4,967,147, Cl. 324-158.00F.

Zenith Electronics Corp.: *See*—
Konopka, John G., 4,967,335, Cl. 363-82.000.

Zepka, David J.: *See*—
Godbey, E. Floyd, Jr.; Wolfe, Norman G.; and Zepka, David J., 4,966,948, Cl. 525-329.900.

Zigler, Arie: *See*—
Ludmirsky, Ariold; and Zigler, Arie, 4,967,186, Cl. 340-575.000.

Zilkowski, Bruce W.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,966,913, Cl. 514-415.000.

Zimmerman, George O.; and Kaplan, Alvaro, to Boston University, Trustees of. Method for electrically joining superconductors to themselves, to normal conductors, and to semi-conductors. 4,966,142, Cl. 228-263.120.

Zimmerman, Rita: *See*—
Rising, Donald B.; and Zimmerman, Rita, 4,966,667, Cl. 204-182.100.

Zip Strip, Inc.: *See*—
Clark, Jack G., Jr.; and Schouster, Joseph W., 4,966,644, Cl. 156-247.000.

Zitz, Alfred; Barnthaler, Franz; and Brandl, Erich, to Voest-Alpine Maschinenbau Gesellschaft m.b.H. Device for guying a drift advancing machine within a drift. 4,966,417, Cl. 299-33.000.

Zitzmann, Klaus, to G. Siempelkamp GmbH & Co. Method of the continuous production of circuit board structures. 4,966,642, Cl. 156-164.000.

Zmyslowski, Allan J.; and Hom, Pat Y., to Amdahl Corporation. Central processor architecture implementing deterministic early condition code analysis using digit based, subterm computation and selective subterm combination. 4,967,351, Cl. 364-200.000.

Zoller, Gerhard; Beyerle, Rudi; and Schindler, Ursula, to Cassella Aktiengesellschaft. Pyrrole derivatives, their preparation and their use as pharmaceutical active compounds. 4,966,901, Cl. 514-211.000.

Zuffada, Maurizio: *See*—
Betti, Giorgio; Zuffada, Maurizio; Sacchi, Fabrizio; and Gornati, Silvano, 4,967,139, Cl. 323-312.000.

Zuhlke, Rainer: *See*—
Ludwig, Thomas; Schettler, Helmut; Wagner, Otto M.; and Zuhlke, Rainer, 4,967,104, Cl. 307-443.000.

Zwijsen, Jan A.: *See*—
De Prijcker, Jozef P.; Zwijsen, Jan A.; Domen, Albrecht F.; and De Rycke, Gino L., 4,967,221, Cl. 354-318.000.

501 Fujitsu Limited: *See*—
Awano, Yuji, 4,967,252, Cl. 357-34.000.

501 Lucas Industries Public Ltd. Company: *See*—
McCusker, Redmond; Heibel, Helmut; and Gilles, Leo, 4,966,530, Cl. 417-273.000.

880335 Ontario Inc.: *See*—
Fotheringham, Scott M.; and Fotheringham, Robin H., 4,966,020, Cl. 70-276.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 30TH DAY OF OCTOBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Acec-Union Miniere S.A., MHO Division: *See*—
De Schepper, Achille; and Van Peteghem, Antoine, Re. 33,410, Cl. 423-89.000.

Ajiki, Yoshio: *See*—
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, Re. 33,411, Cl. 123-198.00F.

Akashi, Kichizo: *See*—
Konishi, Yozo; Akashi, Kichizo; Watase, Hideo; and Yoshioka, Tatsuo, Re. 33,416, Cl. 364-478.000.

Bhagat, Jai P.; and Hays, William D., to Mobile Telecommunication Technologies Corporation. Mobile paging call back system and related method. Re. 33,417, Cl. 379-57.000.

Curtis, John M. Grip assembly. Re. 33,409, Cl. 73-859.000.

Dayco Products, Inc.: *See*—
Oglesby, Donald L.; and Sinnamon, Robert H., Re. 33,412, Cl. 138-126.000.

De Schepper, Achille; and Van Peteghem, Antoine, to Acec-Union Miniere S.A., MHO Division. Liquid-liquid extraction of germanium from aqueous solution using hydroxy-oximes. Re. 33,410, Cl. 423-89.000.

DRI STEEM Humidifier Company: *See*—
Morton, Bernard W., Re. 33,414, Cl. 392-386.000.

Exxon Production Research Company: *See*—
Khan, Shuaib A.; and Haliburton, James, Re. 33,408, Cl. 62-29.000.

Haliburton, James: *See*—
Khan, Shuaib A.; and Haliburton, James, Re. 33,408, Cl. 62-29.000.

Hanifl, Paul H., to Sage Products, Inc. Sharps disposal system. Re. 33,413, Cl. 206-366.000.

Hays, William D.: *See*—
Bhagat, Jai P.; and Hays, William D., Re. 33,417, Cl. 379-57.000.

Hitachi, Ltd.: *See*—
Konishi, Yozo; Akashi, Kichizo; Watase, Hideo; and Yoshioka, Tatsuo, Re. 33,416, Cl. 364-478.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, Re. 33,411, Cl. 123-198.00F.

Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating mechanism for internal combustion engine. Re. 33,411, Cl. 123-198.00F.

Jelic, Marinko. Double-bore capillary-tube gas discharge lamp with an envelope window transparent to short wavelength light. Re. 33,415, Cl. 313-609.000.

Katoh, Masaaki: *See*—
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, Re. 33,411, Cl. 123-198.00F.

Khan, Shuaib A.; and Haliburton, James, to Exxon Production Research Company. Process for LPG recovery. Re. 33,408, Cl. 62-29.000.

Konishi, Yozo; Akashi, Kichizo; Watase, Hideo; and Yoshioka, Tatsuo, to Hitachi, Ltd. Piling planning method and piling system of cargoes by palletizing robot. Re. 33,416, Cl. 364-478.000.

Mobile Telecommunication Technologies Corporation: *See*—
Bhagat, Jai P.; and Hays, William D., Re. 33,417, Cl. 379-57.000.

Morton, Bernard W., to DRI STEEM Humidifier Company. Electric steam humidifier. Re. 33,414, Cl. 392-386.000.

Nagahiro, Kenichi: *See*—
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, Re. 33,411, Cl. 123-198.00F.

Oglesby, Donald L.; and Sinnamon, Robert H., to Dayco Products, Inc. Hose construction. Re. 33,412, Cl. 138-126.000.

Sage Products, Inc.: *See*—
Hanifl, Paul H., Re. 33,413, Cl. 206-366.000.

Schwarz, Milan. Revolving door control system. Re. 33,407, Cl. 49-42.000.

Sinnamon, Robert H.: *See*—
Oglesby, Donald L.; and Sinnamon, Robert H., Re. 33,412, Cl. 138-126.000.

Van Peteghem, Antoine: *See*—
De Schepper, Achille; and Van Peteghem, Antoine, Re. 33,410, Cl. 423-89.000.

Watase, Hideo: *See*—
Konishi, Yozo; Akashi, Kichizo; Watase, Hideo; and Yoshioka, Tatsuo, Re. 33,416, Cl. 364-478.000.

Wior, Carol W., to WIOR Corporation, The. Swimsuit. Re. 33,406, Cl. 2-67.000.

WIOR Corporation, The: *See*—
Wior, Carol W., Re. 33,406, Cl. 2-67.000.

Yoshioka, Tatsuo: *See*—
Konishi, Yozo; Akashi, Kichizo; Watase, Hideo; and Yoshioka, Tatsuo, Re. 33,416, Cl. 364-478.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Beamco, Inc.: *See*—
Breslin, John J., B1 4,070,586, Cl. 307-22.000.

Breslin, John J., to Beamco, Inc. Electric vacuum cleaning and agitator motor control system. B1 4,070,586, 10-30-90, Cl. 307-22.000.

Das, Suryya K.: *See*—
Ranka, Ajay I.; and Das, Suryya K., B1 4,647,612, Cl. 524-458.000.
Ranka, Ajay I.; and Das, Suryya K., B1 4,692,491, Cl. 524-458.000.

Martin, John C.: *See*—
Verbeyden, Julien P.; and Martin, John C., B1 4,355,032, Cl. 514-262.000.

PPG Industries Inc.: *See*—
Ranka, Ajay I.; and Das, Suryya K., B1 4,647,612, Cl. 524-458.000.
Ranka, Ajay I.; and Das, Suryya K., B1 4,692,491, Cl. 524-458.000.

Ranka, Ajay I.; and Das, Suryya K., to PPG Industries Inc. Polymer emulsion products. B1 4,647,612, 10-23-90, Cl. 524-458.000.

Ranka, Ajay I.; and Das, Suryya K., to PPG Industries, Inc. Polymer emulsion products. B1 4,692,491, 10-30-90, Cl. 524-458.000.

Syntex (U.S.A.) Inc.: *See*—
Verbeyden, Julien P.; and Martin, John C., B1 4,355,032, Cl. 514-262.000.

Verbeyden, Julien P.; and Martin, John C., to Syntex (U.S.A.) Inc. 9-(1,3-dihydroxy-2-propoxymethyl)guanine as antiviral agent. B1 4,355,032, 10-30-90, Cl. 514-262.000.

LIST OF DESIGN PATENTEES

AB Gyproc: *See—*
Lofgren, Magnus, 311,674, Cl. D8-98.000.
Aggarwal, Rajkumar S., to Manufacturers Hanover Trust Co. Bottle. 311,681, 10-30-90, Cl. D9-387.000.
Aiken, Brian L.; and Popek, Bruce P., to Child Growth & Development Corporation, The. Toy telephone. 311,761, 10-30-90, Cl. D21-111.000.
Amachi, Ryusuke: *See—*
Tanaka, Masanori; and Amachi, Ryusuke, 311,725, Cl. D13-147.000.
American Cyanamid Company: *See—*
Woodruff, Keith F., 311,768, Cl. D23-209.000.
American Optical Corporation: *See—*
Salce, Arthur J.; and Metcalfe, Richard T., 311,782, Cl. D28-9.000.
Antonious, Anthony J. Iron golf club head. 311,763, 10-30-90, Cl. D21-220.000.
Aoyama, Minoru; and Hirata, Tomohiko, to Canon Kabushiki Kaisha. Combined sheet feeder and editing device for a copying machine. 311,755, 10-30-90, Cl. D18-42.000.
Arai, Takuya; and Nakad.., Kimiaki, to Fuji Photo Film Co., Ltd. Disposable camera. 311,735, 10-30-90, Cl. D14-121.000.
Baltea S.p.A.: *See—*
De Lucchi, Michele, 311,739, Cl. D14-114.000.
Barone, Gary A. Pet bath with shower. 311,794, 10-30-90, Cl. D30-158.000.
Beall, Richard W. Enclosure for a drinking water system. 311,767, 10-30-90, Cl. D23-207.000.
Beam, Tony D. Pair of undershorts. 311,632, 10-30-90, Cl. D2-10.000.
Bird, Jeremy, to Brookes & Gatehouse Limited. Transducer mounting for use with a transducer system for measuring the speed of marine vehicles through the water. 311,701, 10-30-90, Cl. D10-98.000.
Boots, Steven L.; Williams, Oscar H., Jr.; and Wallwork, Barry S., to Stinson Manufacturing Co., Inc. Loading ramp. 311,798, 10-30-90, Cl. D34-32.000.
Bradley, Paul: *See—*
Westwood, Donald C.; Bradley, Paul; Tappel, James G.; and Nuttall, Michael J., 311,737, Cl. D14-114.000.
Brandt, Gert, to MEC A/S. Push button. 311,727, 10-30-90, Cl. D13-174.000.
Brookes & Gatehouse Limited: *See—*
Bird, Jeremy, 311,701, Cl. D10-98.000.
Brown, Harold E., to Video International Vending Associates, Inc. Video cassette vending machine center. 311,775, 10-30-90, Cl. D2-33.000.
Brown, Robert J., Jr.; Erturk, Bahattin; and Hauser, Jon W., to Teletimer International, Inc. Remotely activated switch module for controlling power usage of an appliance. 311,726, 10-30-90, Cl. D13-168.000.
Bryant, David R.; Kochte, Werner W.; and Trombly, Edward F., to Scott Fetzer Company, The. Three-way opener. 311,668, 10-30-90, Cl. D8-40.000.
Bull HN Information Systems Inc.: *See—*
Daniels, George R.; Henneberg, Helmut H.; and Graham, John F., 311,752, Cl. D18-13.000.
Bungert-Chen, Eileen M. Necktie. 311,638, 10-30-90, Cl. D2-605.000.
Burke, Alfred N., to Great Western Manufacturing Co. Tree root ball basket. 311,666, 10-30-90, Cl. D8-1.000.
Butler, Gerald L. Aircraft. 311,720, 10-30-90, Cl. D12-331.000.
Cadestin, Michel. Pasta. 311,627, 10-30-90, Cl. D1-126.000.
Canon Kabushiki Kaisha: *See—*
Aoyama, Minoru; and Hirata, Tomohiko, 311,755, Cl. D18-42.000.
Canovas, Isabelle. Perfume atomizer. 311,786, 10-30-90, Cl. D28-91.100.
Carder Industries, Inc.: *See—*
Wilson, Allan; and Carder, William E., 311,675, Cl. D8-98.000.
Carder, William E.: *See—*
Wilson, Allan; and Carder, William E., 311,675, Cl. D8-98.000.
Carlson, Arthur R., to Decor Corporation Proprietary Limited, The. Food container. 311,665, 10-30-90, Cl. D7-601.000.
Carrano, Thomas; and Petrucci, Raymond, to Cuno, Incorporated. Wall mounted water purifier for home use. 311,766, 10-30-90, Cl. D23-207.000.
Caryl, James A.: *See—*
Eggleston, Robert D.; and Caryl, James A., 311,723, Cl. D13-162.000.
Casio Computer Co., Ltd.: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 311,734, Cl. D14-126.000.
Yoshitake, Isamu, 311,728, Cl. D14-100.000.
Cassai, Gino H.: *See—*
Cassai, Henry J.; and Cassai, Gino H., 311,787, Cl. D28-77.000.
Cassai, Henry J.; and Cassai, Gino H., to Cassai, Henry J. Combined container/bottle and cosmetic wand applicators or the like. 311,787, 10-30-90, Cl. D28-77.000.
Celite S.A. Industria E Comercio: *See—*
Nosari, Waldemar, 311,769, Cl. D23-292.000.
Chan, Jimmy Y., to 501 Achiever Industries Limited. Camera. 311,749, 10-30-90, Cl. D16-218.000.
Chantal Thomass: *See—*
Thomass, Chantal, 311,646, Cl. D5-24.000.
Chapin, David S.; and Morton, Rod E., to Cooper Industries, Inc. Molded tool case. 311,644, 10-30-90, Cl. D3-30.100.
Chenevert, Robert A. Rag doll. 311,762, 10-30-90, Cl. D21-166.000.
Cheng, Willis, to Woods Far East, Inc. Adjustable solar panel. 311,722, 10-30-90, Cl. D13-102.000.
Child Growth & Development Corporation, The: *See—*
Aiken, Brian L.; and Popek, Bruce P., 311,761, Cl. D21-111.000.
Cholagh, Talal. Can and bottle opener. 311,667, 10-30-90, Cl. D8-18.000.
Chubu Industries, Inc.: *See—*
Mitsubayashi, Yoshihiko, 311,658, Cl. D7-378.000.
Cimtron Corp.: *See—*
Krolopp, Rudy, 311,690, Cl. D10-15.000.
Krolopp, Rudy, 311,691, Cl. D10-15.000.
Claveria, Ric, to L.A. Gear, Inc. Shoe upper. 311,635, 10-30-90, Cl. D2-314.000.
Clements, Steven D. Cribbage board. 311,707, 10-30-90, Cl. D10-46.100.
Coleman Outdoor Products, Inc.: *See—*
Stearns, David K., 311,777, Cl. D26-42.000.
Collins, Christopher G. Reclosable debris bag for pool cleaners. 311,796, 10-30-90, Cl. D32-31.000.
Conair Corporation: *See—*
Howard, James M., 311,783, Cl. D28-18.000.
Cooper Industries, Inc.: *See—*
Chapin, David S.; and Morton, Rod E., 311,644, Cl. D3-30.100.
Eggleston, Robert D.; and Caryl, James A., 311,723, Cl. D13-162.000.
Crutchfield, Mack W., to Rotex Company. Electrically-powered eraser. 311,757, 10-30-90, Cl. D19-53.000.
Cuno, Incorporated: *See—*
Carrano, Thomas; and Petrucci, Raymond, 311,766, Cl. D23-207.000.
Daniels, George R.; Henneberg, Helmut H.; and Graham, John F., to Bull HN Information Systems Inc. Printer cabinet or similar article. 311,752, 10-30-90, Cl. D18-13.000.
Decor Corporation Proprietary Limited, The: *See—*
Carlson, Arthur R., 311,665, Cl. D7-601.000.
De Lucchi, Michele, to Baltea S.p.A. Shield for a video display unit. 311,739, 10-30-90, Cl. D14-114.000.
Dennis, Raymond L. Superlight. 311,778, 10-30-90, Cl. D26-45.000.
Diba, Keyvan T.; and Shapiro, Allan M. Container for lottery tickets. 311,683, 10-30-90, Cl. D9-415.000.
Digital Equipment Corporation: *See—*
Landry, Christian C.; Maurer, Bernard J.; and Jaskiel, Stanley J., 311,738, Cl. D14-113.000.
Display Systems International Ltd.: *See—*
Miall, David E., 311,680, Cl. D8-382.000.
Dixon Industries, Inc.: *See—*
Splittstoesser, Clair D., 311,742, Cl. D15-15.000.
Domingo, Alain: *See—*
Scali, Francois; and Domingo, Alain, 311,628, Cl. D1-126.000.
Scali, Francois; and Domingo, Alain, 311,630, Cl. D1-126.000.
Scali, Francois; and Domingo, Alain, 311,631, Cl. D1-126.000.
Eggleston, Robert D.; and Caryl, James A., to Cooper Industries, Inc. Explosion-proof control enclosure. 311,723, 10-30-90, Cl. D13-162.000.
Eliasson, Rolf, to Landstingens Inkopscentral, LIC, Ekonomisk Forening. Sling for lifting a disable person. 311,804, 10-30-90, Cl. D34-28.000.
Elmore, Royal; and Krigel, Henrick Y., to Protech, Inc. In-circuit tester console. 311,698, 10-30-90, Cl. D10-75.000.
Embree, Donald; and Hamann, David L., to Rubbermaid Incorporated. Parts bin. 311,799, 10-30-90, Cl. D34-40.000.
Emerson Electric Co.: *See—*
Hult, David R.; and Tomasiak, Mark J., 311,797, Cl. D32-32.000.
Enbishi Aluminum Wheels Co., Ltd.: *See—*
Yoshida, Tomoaki, 311,717, Cl. D12-211.000.
Erturk, Bahattin: *See—*
Brown, Robert J., Jr.; Erturk, Bahattin; and Hauser, Jon W., 311,726, Cl. D13-168.000.
F & F Industries, Inc.: *See—*
Whitsel, Frank L., 311,718, Cl. D12-213.000.
Feller, Mark J. Cabinet. 311,652, 10-30-90, Cl. D6-471.000.
Fenne, Kenneth R., to Pittway Corporation. Smoke detector. 311,703, 10-30-90, Cl. D10-106.000.
Fenne, Kenneth R.: *See—*
Thorp, Edward J.; and Fenne, Kenneth R., 311,705, Cl. D10-121.000.
Fetty, Lowell L. Pan lid holder. 311,651, 10-30-90, Cl. D6-462.000.
Foot, John: *See—*
Marlowe, Huston; and Foot, John, 311,711, Cl. D12-96.000.
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Freeman, James R. Ceiling fan shroud. 311,773, 10-30-90, Cl. D23-411.000.
Fritz Gegauf Aktiengesellschaft Bernina-Nahmaschinenfabrik: *See—*
Ramsey, Roger, 311,746, Cl. D15-69.000.
Fuji Photo Film Co., Ltd.: *See—*
Arai, Takuya; and Nakada, Kimiaki, 311,735, Cl. D14-121.000.
Fujimura, Yoshinao; and Saito, Yusuki, to Honda Giken Kogyo Kabushiki Kaisha. Automobile. 311,709, 10-30-90, Cl. D12-91.000.
Futo, Robert: *See—*
Kearnes, Thom; and Futo, Robert, 311,654, Cl. D6-545.000.
Gallet, Adrien, to Gallet S.A. Helmet. 311,792, 10-30-90, Cl. D29-14.000.

Gallet S.A.: *See—*
Gallet, Adrien, 311,792, Cl. D29-14.000.
Gatward, Douglas K. Dish. 311,663, 10-30-90, Cl. D7-545.000.
Gaynor, Lawrence D. Manicurist stand. 311,785, 10-30-90, Cl. D28-61.000.
Getto, Eugene, to Itemakers, Ltd. Service cart. 311,802, 10-30-90, Cl. D34-21.000.
Gibbs, Terrence: *See—*
Schwartz, Larry A.; and Gibbs, Terrence, 311,647, Cl. D6-370.000.
Giese, Robert C.: *See—*
Sauter, Bruce M.; and Giese, Robert C., 311,770, Cl. D23-277.000.
Glaxo Group Limited: *See—*
Newell, Robert E.; and Rand, Paul K., 311,684, Cl. D9-418.000.
Gold Star Co., Ltd.: *See—*
Shim, Jae J., 311,732, Cl. D14-135.000.
Yang, Doo S., 311,731, Cl. D14-135.000.
Gosselin, Roland: *See—*
Murphy, Robert H.; and Gosselin, Roland, 311,803, Cl. D34-38.000.
Graef, John T.; and Rowen, Michael J., to Lutron Electronics Co., Inc. Selectable level lighting control faceplate. 311,678, 10-30-90, Cl. D8-353.000.
Graham, John F.: *See—*
Daniels, George R.; Henneberg, Helmut H.; and Graham, John F., 311,752, Cl. D18-13.000.
Great Western Manufacturing Co.: *See—*
Burke, Alfred N., 311,666, Cl. D8-1.000.
Grengs, Cornel J. Fish bag. 311,640, 10-30-90, Cl. D3-38.000.
Groswith, Charles T., III; and Sun, Rickson, to Taurus Holdings, Inc. Binding strip. 311,756, 10-30-90, Cl. D19-32.000.
H. Stoll GmbH & Co.: *See—*
Wieland, Rudolf, 311,745, Cl. D15-66.000.
Hadtke, Frederick B., to Hercules Incorporated. Food container. 311,687, 10-30-90, Cl. D9-425.000.
Haga, Cecil W., to Ishida Foundation, The. Aircraft. 311,719, 10-30-90, Cl. D12-328.000.
Hall, Jacqueline: *See—*
Koldofsky, Eleanor; and Hall, Jacqueline, 311,791, Cl. D29-10.000.
Hamann, David L.: *See—*
Embree, Donald; and Hamann, David L., 311,799, Cl. D34-40.000.
Hamano, Eiji: *See—*
Yamada, Toshiyuki; and Hamano, Eiji, 311,715, Cl. D12-182.000.
Hasback, Francis J. Gyroscopic propelled/stabilized submarine. 311,721, 10-30-90, Cl. D12-308.000.
Happiness Inc.: *See—*
Koldofsky, Eleanor; and Hall, Jacqueline, 311,791, Cl. D29-10.000.
Harrod, Lawrence R.; to Kransco. Toy vehicle. 311,760, 10-30-90, Cl. D21-78.000.
Harsco Corp.: *See—*
Trinkwalder, Joseph C., Jr., 311,788, Cl. D29-6.000.
Hassel, H. Charles; and Westland, Donald, to MicroComputer Accessories, Inc. Printer stand. 311,754, 10-30-90, Cl. D18-23.000.
Hassel, H. Charles: *See—*
Westland, Donald R.; and Hassel, H. Charles, 311,753, Cl. D18-23.000.
Hatfield, Tinker L., to Nike, Inc.; and Nike International, Ltd. Element for a shoe upper. 311,637, 10-30-90, Cl. D2-314.000.
Hauser, Jon W.: *See—*
Brown, Robert J., Jr.; Erturk, Bahattin; and Hauser, Jon W., 311,726, Cl. D13-168.000.
Headrick, David D. Hinge pin stop. 311,677, 10-30-90, Cl. D8-323.000.
Henneberg, Helmut H.: *See—*
Daniels, George R.; Henneberg, Helmut H.; and Graham, John F., 311,752, Cl. D18-13.000.
Hercules Incorporated: *See—*
Hadtke, Frederick B., 311,687, Cl. D9-425.000.
Hirata, Tomohiko: *See—*
Aoyama, Minoru; and Hirata, Tomohiko, 311,755, Cl. D18-42.000.
Hodge, John E. Container cover. 311,688, 10-30-90, Cl. D9-435.000.
Hollander, Milton B.; Tapolcai, Laszlo; and Rounds, George R., to Omega Engineering, Inc. Chart recorder. 311,695, 10-30-90, Cl. D10-46.000.
Homark Associates Limited: *See—*
Start, Michael J., 311,660, Cl. D7-397.000.
Start, Michael J., 311,661, Cl. D7-397.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Fujimura, Yoshinao; and Saito, Yusuki, 311,709, Cl. D12-91.000.
Tsuyoshi, Nishimura; Takahito, Tsuji; and Iwao, Honma, 311,710, Cl. D12-92.000.
Yamada, Toshiyuki; and Hamano, Eiji, 311,715, Cl. D12-182.000.
Hosiden Electronics Co., Ltd.: *See—*
Tanaka, Masanori; and Amachi, Ryusuke, 311,725, Cl. D13-147.000.
Houghton, John, to NCI Norsk Computer Industria. Computer. 311,730, 10-30-90, Cl. D14-102.000.
Howard, James M., to Conair Corporation. Housing for hair dryer. 311,783, 10-30-90, Cl. D28-18.000.
Huang, George Y., to Turn-Luckily International Inc. Mini-din adaptor or similar article. 311,724, 10-30-90, Cl. D13-146.000.
Hult, David R.; and Tomasiak, Mark J., to Emerson Electric Co. Vacuum cleaner squeegee attachment. 311,797, 10-30-90, Cl. D32-32.000.
Ibanez, Rene L. Combined umbrella and cover therefor. 311,639, 10-30-90, Cl. D3-5.000.
Ide, Tetsuya; and Kida, Kenichi, to Terumo Kabushiki Kaisha. Electronic thermometer probe. 311,689, 10-30-90, Cl. D10-60.000.
Ide, Tetsuya; and Kida, Kenichi, to Terumo Kabushiki Kaisha. Electronic thermometer probe. 311,696, 10-30-90, Cl. D10-60.000.
IMC International Ltd.: *See—*
Kwon, Jung I., 311,748, Cl. D16-133.000.
International Flavors & Fragrances Inc.: *See—*
Lindauer, Jerome I., 311,653, Cl. D6-542.000.
Ishida Foundation, The: *See—*
Haga, Cecil W., 311,719, Cl. D12-328.000.
Ishihara, Kousei. Dent puller. 311,670, 10-30-90, Cl. D8-526211.000.
Ishizuka, Shigeo: *See—*
Kuzuno, Katsutoshi; Ishizuka, Shigeo; Watanabe, Hiroshi; and Sakurai, Kazuaki, 311,733, Cl. D13-133.000.
Itemakers, Ltd.: *See—*
Getto, Eugene, 311,802, Cl. D34-21.000.
Iwao, Honma: *See—*
Tsuyoshi, Nishimura; Takahito, Tsuji; and Iwao, Honma, 311,710, Cl. D12-92.000.
Jaskiel, Stanley J.: *See—*
Landry, Christian C.; Maurer, Bernard J.; and Jaskiel, Stanley J., 311,738, Cl. D14-113.000.
John Fluke Mfg. Co., Inc.: *See—*
Nelson, Michael D., 311,700, Cl. D10-78.000.
Johnson, Donald R. Putty holder. 311,672, 10-30-90, Cl. D8-71.000.
Johnson, Donald R. Cutter for trimming ceiling paint. 311,673, 10-30-90, Cl. D8-98.000.
Kang, Dong M., to Korea Measures Co., Ltd. Measuring tape case. 311,697, 10-30-90, Cl. D10-72.000.
Kearnes, Thom; and Futo, Robert, to State Chemical Manufacturing Company. Soap dispenser. 311,654, 10-30-90, Cl. D6-545.000.
Keller, H. Thomas, to Rosal Co., Inc. Cabinet. 311,649, 10-30-90, Cl. D6-445.000.
Keller, H. Thomas, to Rosalco., Inc. Cabinet. 311,650, 10-30-90, Cl. D6-446.000.
Kern, Jeffrey J. Sump pump failure alarm. 311,702, 10-30-90, Cl. D10-106.000.
Kida, Kenichi: *See—*
Ide, Tetsuya; and Kida, Kenichi, 311,689, Cl. D10-60.000.
Ide, Tetsuya; and Kida, Kenichi, 311,696, Cl. D10-60.000.
Kiiski, Heikki, to Treston Oy. Storage box. 311,800, 10-30-90, Cl. D34-40.000.
Koch, Olivier: *See—*
Zaugg, Hans; and Koch, Olivier, 311,706, Cl. D10-128.000.
Kochte, Werner W.: *See—*
Bryant, David R.; Kochte, Werner W.; and Trombly, Edward F., 311,668, Cl. D8-40.000.
Koetzle, Hans U. Cargo anchor unit. 311,714, 10-30-90, Cl. D12-155.000.
Kohler Co.: *See—*
Sauter, Bruce M.; and Giese, Robert C., 311,770, Cl. D23-277.000.
Koldofsky, Eleanor and Hall, Jacqueline, to Happiness Inc. Knee pad. 311,791, 10-30-90, Cl. D29-10.000.
Korea Measures Co., Ltd.: *See—*
Kang, Dong M., 311,697, Cl. D10-72.000.
Kotylak, Gary D. Game board. 311,758, 10-30-90, Cl. D21-25.000.
Kransco: *See—*
Harrod, Lawrence R., 311,760, Cl. D21-78.000.
Krief, Jean-Michel, to Vancouver Projects International, Inc. Elbow shock absorber. 311,790, 10-30-90, Cl. D29-20.000.
Krigel, Henrick Y.: *See—*
Elmore, Royal; and Krigel, Henrick Y., 311,698, Cl. D10-75.000.
Krol, Leonardus A. C., to U.S. Philips Corporation. Torch. 311,776, 10-30-90, Cl. D26-42.000.
Krol, Leonardus A. C., to U.S. Philips Corporation. Torch. 311,779, 10-30-90, Cl. D26-46.000.
Krolopp, Rudy, to Cimtron Corp. Clock. 311,690, 10-30-90, Cl. D10-15.000.
Krolopp, Rudy, to Cimtron Corp. Clock. 311,691, 10-30-90, Cl. D10-15.000.
Kulak, Joseph. Horseshoe for hind hoof. 311,793, 10-30-90, Cl. D30-148.000.
Kullenberg, Gunnar. Waste receptacle. 311,801, 10-30-90, Cl. D34-5.000.
Kuzuno, Katsutoshi; Ishizuka, Shigeo; Watanabe, Hiroshi; and Sakurai, Kazuaki, to Yazaki Corporation. Housing for an electrical connector. 311,733, 10-30-90, Cl. D13-133.000.
Kwon, Jung I., to IMC International Ltd. Binoculars. 311,748, 10-30-90, Cl. D16-133.000.
L.A. Gear, Inc.: *See—*
Claveria, Ric, 311,635, Cl. D2-314.000.
Magdaleno, Janell, 311,636, Cl. D2-314.000.
Quan, Patricia D., 311,634, Cl. D2-314.000.
Landry, Christian C.; Maurer, Bernard J.; and Jaskiel, Stanley J., to Digital Equipment Corporation. Video display terminal. 311,738, 10-30-90, Cl. D14-113.000.
Landstingens Inkopscentral, LIC, Ekonomisk Forening: *See—*
Eliasson, Rolf, 311,804, Cl. D34-28.000.
Lax, Milton J., to Milrob Corporation. Combined medicinal container and dispenser. 311,774, 10-30-90, Cl. D24-34.000.
Lindauer, Jerome I., to International Flavors & Fragrances Inc. Liquid soap dispensing container. 311,653, 10-30-90, Cl. D6-542.000.
Lofgren, Magnus, to AB Gyproc. Gypsum wallboard cutter. 311,674, 10-30-90, Cl. D8-98.000.
Lorenzana, Moises B.; and Lorenzana, Vance A. Food tray with cup holder. 311,662, 10-30-90, Cl. D7-505.000.
Lorenzana, Vance A.: *See—*
Lorenzana, Moises B.; and Lorenzana, Vance A., 311,662, Cl. D7-505.000.

Lutron Electronics Co., Inc.: *See—*
Graef, John T.; and Rowen, Michael J., 311,678, Cl. D8-353.000.
MacDonald, Scott W. Hat. 311,633, 10-30-90, Cl. D2-252.000.
MacDonald, Sumner B. Knife key holder. 311,642, 10-30-90, Cl. D3-62.000.
MacDonald, Sumner B. Knife key holder. 311,643, 10-30-90, Cl. D3-62.000.
Magdaleno, Janell, to L.A. Gear, Inc. Shoe upper. 311,636, 10-30-90, Cl. D2-314.000.
Mannschreck, Susan N. Disposable pet litter housing. 311,795, 10-30-90, Cl. D30-161.000.
Manufacturers Hanover Trust Co.: *See—*
Aggarwal, Rajkumar S., 311,681, Cl. D9-387.000.
Marlowe, Huston; and Foot, John, to Paccar, Inc. Integral truck cab front nose panel, grille and recessed headlights. 311,711, 10-30-90, Cl. D12-96.000.
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, to Paccar Inc. Exterior shell of a truck cab body. 311,712, 10-30-90, Cl. D12-96.000.
Martin Archery, Inc.: *See—*
Martin, Terry G., 311,641, Cl. D3-38.000.
Martin, Terry G., to Martin Archery, Inc. Quiver hood for archery bows. 311,641, 10-30-90, Cl. D3-38.000.
Maurer, Bernard J.: *See—*
Landry, Christian C.; Maurer, Bernard J.; and Jaskiel, Stanley J., 311,738, Cl. D14-113.000.
May, David C., to Minnesota Mining and Manufacturing Company. Pavement marker. 311,704, 10-30-90, Cl. D10-113.000.
Mazda Motor Corporation: *See—*
Tozawa, Tsutomu, 311,685, Cl. D9-423.000.
Tozawa, Tsutomu, 311,686, Cl. D9-423.000.
McAfee, Kevin E.; McAfee, Sean A.; and Todd, Stephen M. Safety shield for a portable litter. 311,713, 10-30-90, Cl. D12-133.000.
McAfee, Sean A.: *See—*
McAfee, Kevin E.; McAfee, Sean A.; and Todd, Stephen M., 311,713, Cl. D12-133.000.
MEC A/S: *See—*
Brandt, Gert, 311,727, Cl. D13-174.000.
Meloche, Joyce R. Rack for sewing supplies. 311,655, 10-30-90, Cl. D6-573.000.
Metcalfe, Richard T.: *See—*
Salce, Arthur J.; and Metcalfe, Richard T., 311,782, Cl. D28-9.000.
Miall, David E., to Display Systems International Ltd. Frame corner connector. 311,680, 10-30-90, Cl. D8-382.000.
MicroComputer Accessories, Inc.: *See—*
Hassel, H. Charles; and Westland, Donald, 311,754, Cl. D18-23.000.
Westland, Donald R.; and Hassel, H. Charles, 311,753, Cl. D18-23.000.
Mihic, Wlajko. Cutting tool holder. 311,747, 10-30-90, Cl. D15-140.000.
Milrob Corporation: *See—*
Lax, Milton J., 311,774, Cl. D24-34.000.
Minnesota Mining and Manufacturing Company: *See—*
May, David C., 311,704, Cl. D10-113.000.
Misico, John J. Knife for bean pullers or the like. 311,744, 10-30-90, Cl. D15-28.000.
Mitsubayashi, Yoshihiko, to Chubu Industries, Inc. Machine for making soft ice drink. 311,658, 10-30-90, Cl. D7-378.000.
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, to Casio Computer Co., Ltd. Portable television set. 311,734, 10-30-90, Cl. D14-126.000.
Mo, Hai-Ning. Battery and bulb indicator. 311,699, 10-30-90, Cl. D10-78.000.
Monami Products Ltd.: *See—*
Thomson, Harry S.; and Raffo, David, 311,759, Cl. D21-65.000.
Morris, George R. Holder for oxygenator bottle. 311,679, 10-30-90, Cl. D8-373.000.
Morton, Rod E.: *See—*
Chapin, David S.; and Morton, Rod E., 311,644, Cl. D3-30.100.
Murphy, Robert H.; and Gosselin, Roland, to R.H. Murphy Co. Pallet. 311,803, 10-30-90, Cl. D34-38.000.
N.E. National Battery Factory (H.K.) Ltd.: *See—*
Yang, Chi-Wing, 311,772, Cl. D23-378.000.
Nakada, Kimiaki: *See—*
Arai, Takuya; and Nakada, Kimiaki, 311,735, Cl. D14-121.000.
Nakatsuka, Hiroshi: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 311,734, Cl. D14-126.000.
NCI Norsk Computer Industria: *See—*
Houghton, John, 311,730, Cl. D14-102.000.
Neal, Kenneth L. Bicycle handlebar grip. 311,676, 10-30-90, Cl. D8-303.000.
Nelson, Michael D., to John Fluke Mfg. Co., Inc. Digital multimeter. 311,700, 10-30-90, Cl. D10-78.000.
Newell, Robert E.; and Rand, Paul K., to Glaxo Group Limited. Presentation box. 311,684, 10-30-90, Cl. D9-418.000.
Nike, Inc.: *See—*
Hatfield, Tinker L., 311,637, Cl. D2-314.000.
Nike International, Ltd.: *See—*
Hatfield, Tinker L., 311,637, Cl. D2-314.000.
Nomizu, Hidekatsu. Clock. 311,692, 10-30-90, Cl. D10-22.000.
Nosari, Waldemar, to Celite S.A. Industria E Comercio. Pedestral lavatory. 311,769, 10-30-90, Cl. D23-292.000.
Nuttall, Michael J.: *See—*
Westwood, Donald C.; Bradley, Paul; Tappel, James G.; and Nuttall, Michael J., 311,737, Cl. D14-114.000.
Omega Engineering, Inc.: *See—*
Hollander, Milton B.; Tapolcai, Laszlo; and Rounds, George R., 311,695, Cl. D10-46.000.
Omni Products International, Inc.: *See—*
Schwartz, Larry A.; and Gibbs, Terrence, 311,647, Cl. D6-370.000.
Paccar, Inc.: *See—*
Marlowe, Huston; and Foot, John, 311,711, Cl. D12-96.000.
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Pate, J. Stephen. Modular video cassette display rack. 311,657, 10-30-90, Cl. D6-574.000.
Paul, Jeff: *See—*
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Perelli Corporation: *See—*
Perelli, David E., 311,736, Cl. D14-121.000.
Perelli, David E., to Perelli Corporation. Tape cassette. 311,736, 10-30-90, Cl. D14-121.000.
Peterson, Robert J., to Swede Industries, Inc. Fishing reel. 311,764, 10-30-90, Cl. D22-141.000.
Peterson, Robert J., to Swede Industries, Inc. Fishing reel. 311,765, 10-30-90, Cl. D22-141.000.
Petrucci, Raymond: *See—*
Carrano, Thomas; and Petrucci, Raymond, 311,766, Cl. D23-207.000.
Pevsner, Stella M. Combined footstool and adjustable table. 311,648, 10-30-90, Cl. D6-397.000.
Pittway Corporation: *See—*
Fenne, Kenneth R., 311,703, Cl. D10-106.000.
Thorp, Edward J.; and Fenne, Kenneth R., 311,705, Cl. D10-121.000.
Plus Development: *See—*
Westwood, Donald C.; Bradley, Paul; Tappel, James G.; and Nuttall, Michael J., 311,737, Cl. D14-114.000.
Pope, Robert R. Sand diverter bar for use on an earth moving vehicle, or similar article. 311,743, 10-30-90, Cl. D15-28.000.
Popek, Bruce P.: *See—*
Aiken, Brian L.; and Popek, Bruce P., 311,761, Cl. D21-111.000.
Pound, Virgil E.: *See—*
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Procter & Gamble Company, The: *See—*
Vandebroek, Marcel, 311,682, Cl. D9-404.000.
Protech, Inc.: *See—*
Elmore, Royal; and Krigel, Henrick Y., 311,698, Cl. D10-75.000.
Quan, Patricia D., to L.A. Gear, Inc. Shoe upper. 311,634, 10-30-90, Cl. D2-314.000.
R.H. Murphy Co.: *See—*
Murphy, Robert H.; and Gosselin, Roland, 311,803, Cl. D34-38.000.
Raffo, David: *See—*
Thomson, Harry S.; and Raffo, David, 311,759, Cl. D21-65.000.
Ragot, Christina. Pasta. 311,629, 10-30-90, Cl. D1-126.000.
Ramsey, Roger, to Fritz Gegauf Aktiengesellschaft Bernina-Nahmaschinenfabrik. Sewing machine. 311,746, 10-30-90, Cl. D15-69.000.
Rand, Paul K.: *See—*
Newell, Robert E.; and Rand, Paul K., 311,684, Cl. D9-418.000.
Rankin, Charles S. Badge. 311,708, 10-30-90, Cl. D11-95.000.
Ray, Bob: *See—*
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Robert Krups Stiftung & Co. KG.: *See—*
Storsberg, Gunter, 311,659, Cl. D7-384.000.
Roberts, Curt P. Electric guitar. 311,750, 10-30-90, Cl. D17-14.000.
Roberts, Simon: *See—*
Warwick, Roger M.; and Roberts, Simon, 311,645, Cl. D4-115.000.
Rosal Co., Inc.: *See—*
Keller, H. Thomas, 311,649, Cl. D6-445.000.
Rosalco., Inc.: *See—*
Keller, H. Thomas, 311,650, Cl. D6-446.000.
Rotex Company: *See—*
Crutchfield, Mack W., 311,757, Cl. D19-53.000.
Rounds, George R.: *See—*
Hollander, Milton B.; Tapolcai, Laszlo; and Rounds, George R., 311,695, Cl. D10-46.000.
Rowen, Michael J.: *See—*
Graef, John T.; and Rowen, Michael J., 311,678, Cl. D8-353.000.
Rubbermaid Incorporated: *See—*
Embree, Donald; and Hamann, David L., 311,799, Cl. D34-40.000.
Saito, Yusuki: *See—*
Fujimura, Yoshinao; and Saito, Yusuki, 311,709, Cl. D12-91.000.
Sakai, Hiroaki, to Seiko Epson Corporation. Portable computer. 311,741, 10-30-90, Cl. D14-106.000.
Sakurai, Kazuaki: *See—*
Kuzuno, Katsutoshi; Ishizuka, Shigeo; Watanabe, Hiroshi; and Sakurai, Kazuaki, 311,733, Cl. D13-133.000.
Salce, Arthur J.; and Metcalfe, Richard T., to American Optical Corporation. Disposable faceshield. 311,782, 10-30-90, Cl. D28-9.000.
Sasaki, Asao: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 311,734, Cl. D14-126.000.
Sato, Hisano. Combined stapler and perforator. 311,669, 10-30-90, Cl. D8-50.000.
Sauter, Bruce M.; and Giese, Robert C., to Kohler Co. Bathtub or the like. 311,770, 10-30-90, Cl. D23-277.000.
Scali, Francois; and Domingo, Alain. Pasta. 311,628, 10-30-90, Cl. D1-126.000.

Scali, Francois; and Domingo, Alain. Pasta. 311,630, 10-30-90, Cl. D1-126.000.
Scali, Francois; and Domingo, Alain. Pasta. 311,631, 10-30-90, Cl. D1-126.000.
Schwartz, Larry A.; and Gibbs, Terrence, to Omni Products International, Inc. Chair. 311,647, 10-30-90, Cl. D6-370.000.
Schwartz, Michael, to Wilkinson Sword GmbH. Razor handle. 311,784, 10-30-90, Cl. D28-48.000.
Scott Fetzer Company, The: *See*—
Bryant, David R.; Kochte, Werner W.; and Trombly, Edward F., 311,668, Cl. D8-40.000.
Seiko Epson Corporation: *See*—
Sakai, Hiroaki, 311,741, Cl. D14-106.000.
Uchihori, Noritaka, 311,729, Cl. D14-100.000.
Shapiro, Allan M.: *See*—
Diba, Keyvan T.; and Shapiro, Allan M., 311,683, Cl. D9-415.000.
Shim, Jae J., to Gold Star Co., Ltd. Video cassette recorder. 311,732, 10-30-90, Cl. D14-135.000.
Smith, Clarence E. Toilet tank top. 311,771, 10-30-90, Cl. D23-313.000.
Splitttstoesser, Clair D., to Dixon Industries, Inc. Riding lawn mower. 311,742, 10-30-90, Cl. D15-15.000.
Starck, Philippe. Pasta. 311,625, 10-30-90, Cl. D1-126.000.
Starck, Philippe. Pasta. 311,626, 10-30-90, Cl. D1-126.000.
Start, Michael J., to Homark Associates Limited. Stanchion for a beverage tap. 311,660, 10-30-90, Cl. D7-397.000.
Start, Michael J., to Homark Associates Limited. Stanchion for a beverage tap. 311,661, 10-30-90, Cl. D7-397.000.
State Chemical Manufacturing Company: *See*—
Kearnes, Thom; and Futo, Robert, 311,654, Cl. D6-545.000.
Stearns, David K., to Coleman Outdoor Products, Inc. Combined flashlight and fluorescent lantern. 311,777, 10-30-90, Cl. D26-42.000.
Stevens, Delbert W., Jr. Spice shaker. 311,664, 10-30-90, Cl. D7-591.000.
Stinson Manufacturing Co., Inc.: *See*—
Boots, Steven L.; Williams, Oscar H., Jr.; and Wallwork, Barry S., 311,798, Cl. D34-32.000.
Storsberg, Gunter, to Robert Krups Stiftung & Co. KG. Food processor. 311,659, 10-30-90, Cl. D7-384.000.
Sun, Rickson: *See*—
Groswith, Charles T., III; and Sun, Rickson, 311,756, Cl. D19-32.000.
Swatch, SA: *See*—
Zaugg, Hans; and Koch, Olivier, 311,706, Cl. D10-128.000.
Swede Industries, Inc.: *See*—
Peterson, Robert J., 311,764, Cl. D22-141.000.
Peterson, Robert J., 311,765, Cl. D22-141.000.
Takahito, Tsuji: *See*—
Tsuyoshi, Nishimura; Takahito, Tsuji; and Iwao, Honma, 311,710, Cl. D12-92.000.
Tanaka, Masanori; and Amachi, Ryusuke, to Hoisden Electronics Co., Ltd. Jack. 311,725, 10-30-90, Cl. D13-147.000.
Tao, Michikazu: *See*—
Marlowe, Huston; Pound, Virgil E.; Foot, John; Paul, Jeff; Ray, Bob; and Tao, Michikazu, 311,712, Cl. D12-96.000.
Tapolcai, Laszlo: *See*—
Hollander, Milton B.; Tapolcai, Laszlo; and Rounds, George R., 311,695, Cl. D10-46.000.
Tappel, James G.: *See*—
Westwood, Donald C.; Bradley, Paul; Tappel, James G.; and Nuttall, Michael J., 311,737, Cl. D14-114.000.
Taurus Holdings, Inc.: *See*—
Groswith, Charles T., III; and Sun, Rickson, 311,756, Cl. D19-32.000.
Teletimer International, Inc.: *See*—
Brown, Robert J., Jr.; Erturk, Bahattin; and Hauser, Jon W., 311,726, Cl. D13-168.000.
Terumo Kabushiki Kaisha: *See*—
Ide, Tetsuya; and Kida, Kenichi, 311,689, Cl. D10-60.000.
Ide, Tetsuya; and Kida, Kenichi, 311,696, Cl. D10-60.000.
Thomas French & Son PLC: *See*—
Warwick, Roger M.; and Roberts, Simon, 311,645, Cl. D4-115.000.
Thomass, Chantal, to Chantal Thomass. Sheet material with engraved lace pattern. 311,646, 10-30-90, Cl. D5-24.000.
Thomson, Harry S.; and Raffo, David, to Monami Products Ltd. Toy rattle. 311,759, 10-30-90, Cl. D21-65.000.
Thorp, Edward J.; and Fenne, Kenneth R., to Pittway Corporation. Combined electrical outlet cover and mounting plate for strobe light for fire alarm systems or the like. 311,705, 10-30-90, Cl. D10-121.000.
Todd, Stephen M.: *See*—
McAfee, Kevin E.; McAfee, Sean A.; and Todd, Stephen M., 311,713, Cl. D12-133.000.
Tomasiak, Mark J.: *See*—
Hult, David R.; and Tomasiak, Mark J., 311,797, Cl. D32-32.000.
Tozawa, Tsutomu, to Mazda Motor Corporation. Box. 311,685, 10-30-90, Cl. D9-423.000.
Tozawa, Tsutomu, to Mazda Motor Corporation. Box. 311,686, 10-30-90, Cl. D9-423.000.
Treston Oy: *See*—
Kiiski, Heikki, 311,800, Cl. D34-40.000.
Trinkwalder, Joseph C., Jr., to Harsco Corp. Valve for scuba equipment or the like. 311,788, 10-30-90, Cl. D29-6.000.
Trombly, Edward F.: *See*—
Bryant, David R.; Kochte, Werner W.; and Trombly, Edward F., 311,668, Cl. D8-40.000.
Tsuyoshi, Nishimura; Takahito, Tsuji; and Iwao, Honma, to Honda Giken Kogyo Kabushiki Kaisha. Automobile. 311,710, 10-30-90, Cl. D12-92.000.
Turn-Luckily International Inc.: *See*—
Huang, George Y., 311,724, Cl. D13-146.000.
Uchihori, Noritaka, to Seiko Epson Corporation. Personal computer. 311,729, 10-30-90, Cl. D14-100.000.
U.S. Philips Corporation: *See*—
Krol, Leonardus A. C., 311,776, Cl. D26-42.000.
Krol, Leonardus A. C., 311,779, Cl. D26-46.000.
Urquhart, Ferrion. Pocket flashlight. 311,780, 10-30-90, Cl. D26-46.000.
Usher, Scott D. Adjustable lighting fixture. 311,781, 10-30-90, Cl. D26-65.000.
Vancouver Projects International, Inc.: *See*—
Krief, Jean-Michel, 311,790, Cl. D29-20.000.
Vandebroek, Marcel, to Procter & Gamble Company, The. Bottle. 311,682, 10-30-90, Cl. D9-404.000.
Video International Vending Associates, Inc.: *See*—
Brown, Harold E., 311,775, Cl. D25-33.000.
Villarreal, Richard; and Villarreal, Yvonne A. Protective mask. 311,789, 10-30-90, Cl. D29-9.000.
Villarreal, Yvonne A.: *See*—
Villarreal, Richard; and Villarreal, Yvonne A., 311,789, Cl. D29-9.000.
Wagner, Eric. Housing for electronic equipment used in data communication. 311,740, 10-30-90, Cl. D14-107.000.
Wallwork, Barry S.: *See*—
Boots, Steven L.; Williams, Oscar H., Jr.; and Wallwork, Barry S., 311,798, Cl. D34-32.000.
Warrington, Elizabeth M. Line guide. 311,751, 10-30-90, Cl. D19-34.000.
Warwick, Roger M.; and Roberts, Simon, to Thomas French & Son PLC. Fountain brush. 311,645, 10-30-90, Cl. D4-115.000.
Watanabe, Hiroshi: *See*—
Kuzuno, Katsutoshi; Ishizuka, Shigeo; Watanabe, Hiroshi; and Sakurai, Kazuaki, 311,733, Cl. D13-133.000.
Westland, Donald: *See*—
Hassel, H. Charles; and Westland, Donald, 311,754, Cl. D18-23.000.
Westland, Donald R.; and Hassel, H. Charles, to MicroComputer Accessories, Inc. Printer stand. 311,753, 10-30-90, Cl. D18-23.000.
Westwood, Donald C.; Bradley, Paul; Tappel, James G.; and Nuttall, Michael J., to Plus Development. Removable hard disk drive module. 311,737, 10-30-90, Cl. D14-114.000.
Whitsel, Frank L., to F & F Industries, Inc. Front wheel balancer. 311,718, 10-30-90, Cl. D12-213.000.
Widrig, Craig J. Vehicle visor-shade. 311,716, 10-30-90, Cl. D12-191.000.
Wieland, Rudolf, to H. Stoll GmbH & Co. Flat-bed knitting machine. 311,745, 10-30-90, Cl. D15-66.000.
Wilkinson Sword GmbH: *See*—
Schwartz, Michael, 311,784, Cl. D28-48.000.
Williams, Oscar H., Jr.: *See*—
Boots, Steven L.; Williams, Oscar H., Jr.; and Wallwork, Barry S., 311,798, Cl. D34-32.000.
Wilson, Allan; and Carder, William E., to Carder Industries, Inc. Combined knife handle and blade holder therefor. 311,675, 10-30-90, Cl. D8-98.000.
Wolfe, Budde A. Spark plug wire puller. 311,671, 10-30-90, Cl. D8-52.000.
Woodruff, Keith F., to American Cyanamid Company. Water filter valve. 311,768, 10-30-90, Cl. D23-209.000.
Woods Far East, Inc.: *See*—
Cheng, Willis, 311,722, Cl. D13-102.000.
Woomer, Benjamin E. Wristwatch. 311,693, 10-30-90, Cl. D10-39.000.
Woomer, Benjamin E. Wristwatch. 311,694, 10-30-90, Cl. D10-39.000.
Yamada, Toshiyuki; and Hamano, Eiji, to Honda Giken Kogyo Kabushiki Kaisha. Exterior shell of a motorcycle front fairing unit. 311,715, 10-30-90, Cl. D12-182.000.
Yang, Chi-Wing, to N.E. National Battery Factory (H.K.) Ltd. Electric fan. 311,772, 10-30-90, Cl. D23-378.000.
Yang, Doo S., to Gold Star Co., Ltd. Video cassette recorder. 311,731, 10-30-90, Cl. D14-135.000.
Yazaki Corporation: *See*—
Kuzuno, Katsutoshi; Ishizuka, Shigeo; Watanabe, Hiroshi; and Sakurai, Kazuaki, 311,733, Cl. D13-133.000.
Yeh, Hsu-Chieh; and Yeh, Quey-Mei. Soap holder. 311,656, 10-30-90, Cl. D6-536.000.
Yeh, Quey-Mei: *See*—
Yeh, Hsu-Chieh; and Yeh, Quey-Mei, 311,656, Cl. D6-536.000.
Yoshida, Tomoaki, to Enbishi Aluminum Wheels Co., Ltd. Automobile wheel. 311,717, 10-30-90, Cl. D12-211.000.
Yoshitake, Isamu, to Casio Computer Co., Ltd. Central processing unit. 311,728, 10-30-90, Cl. D14-100.000.
Zaugg, Hans; and Koch, Olivier, to Swatch, SA. Watch support. 311,706, 10-30-90, Cl. D10-128.000.
501 Achiever Industries Limited: *See*—
Chan, Jimmy Y., 311,749, Cl. D16-218.000.

LIST OF PLANT PATENTEES

Etablissement Guillou Freres Jacques, Bernard et Maurice: *See*—
Guillou, Jacques; Guillou, Bernard; and Guillou, Maurice, 7,373, Cl. 68.000.

Guillou, Bernard: *See*—
Guillou, Jacques; Guillou, Bernard; and Guillou, Maurice, 7,373, Cl. 68.000.

Guillou, Jacques; Guillou, Bernard; and Guillou, Maurice, to Etablissement Guillou Freres Jacques, Bernard et Maurice. Variety of Geranium named Camille. 7,373, 10-30-90, Cl. 68.000.

Guillou, Maurice: *See*—
Guillou, Jacques; Guillou, Bernard; and Guillou, Maurice, 7,373, Cl. 68.000.

Ilsink, Peter, to Jackson & Perkins Company. Rose plant Interlien. 7,368, 10-30-90, Cl. 26.000.

Jackson & Perkins Company: *See*—
Ilsink, Peter, 7,368, Cl. 26.000.

Kientzler, Ludwig, to Paul Ecke Ranch. Impatiens plant named Patula. 7,371, 10-30-90, Cl. 68.000.

Kientzler, Ludwig, to Paul Ecke Ranch. Impatiens plant named Marumba. 7,372, 10-30-90, Cl. 68.000.

Klemm, Siegfried, to Klemm & Sohn. Geranium named Klefizon. 7,374, 10-30-90, Cl. 68.000.

Klemm & Sohn: *See*—
Klemm, Siegfried, 7,374, Cl. 68.000.

Moser, Frank C., to Yoder Brothers, Inc. Hibiscus plant named Aloha Pink. 7,369, 10-30-90, Cl. 54.000.

Moser, Frank C., to Yoder Brothers, Inc. Hibiscus plant named Hawaiian Holly. 7,370, 10-30-90, Cl. 54.000.

Paul Ecke Ranch: *See*—
Kientzler, Ludwig, 7,371, Cl. 68.000.
Kientzler, Ludwig, 7,372, Cl. 68.000.

Yoder Brothers, Inc.: *See*—
Moser, Frank C., 7,369, Cl. 54.000.
Moser, Frank C., 7,370, Cl. 54.000.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 30, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

2.1 A 4,965,886
9 4,965,887
67 Re.33,406
104 4,965,888

CLASS 4

234 4,965,889
240 4,965,890
366 4,965,891
368 4,965,892
542 4,965,893
605 4,965,894

CLASS 5

414 4,965,895
424 4,965,896
446 4,965,897
453 4,965,899
463 4,965,900
465 4,965,901
468 4,965,898

CLASS 8

150 4,965,902
549 4,966,607

CLASS 14

1 4,965,903

CLASS 15

97.1 4,965,904
4,965,905
104.92 4,965,906

CLASS 16

114 A 4,965,907

CLASS 17

11 4,965,908
21 4,965,909
49 4,965,910
51 4,965,911

CLASS 19

159 R 4,965,912

CLASS 24

3 C 4,965,913
270 4,965,914
607 4,965,915

CLASS 26

18.5 4,965,918

CLASS 28

220 4,965,919
271 4,965,916
295 4,965,917

CLASS 29

112 4,965,920
254 4,965,921
426.4 4,965,922
566.3 4,965,923
596 4,965,924
623 4,965,925
705 4,965,926
740 4,965,927
742 4,965,928
4,965,929
758 4,965,930
783 4,965,931
861 4,965,932
882 4,965,933

CLASS 30

387 4,965,934

CLASS 33

26 4,965,935
199 R 4,965,936
4,965,937
265 4,965,938
558 4,965,939
651.1 4,965,940
668 4,965,941
730 4,965,942
758 4,965,943
760 4,965,944

CLASS 37

142 R 4,965,945

CLASS 40

124.4 4,965,946
471 4,965,947
537 4,965,948
546 4,965,950
642 4,965,949

CLASS 42

49.01 4,965,951
70.01 4,965,952

CLASS 43

2 4,965,953
4 4,965,954
4,965,955
43.1 4,965,956
44.82 4,965,957
55 4,965,958
61 4,965,959

CLASS 44

624 4,966,608

CLASS 47

1.5 4,965,960
46 4,965,961
65 4,965,962
81 4,965,963

CLASS 49

42 Re.33,407

CLASS 51

47 4,965,964
55 4,965,965
273 4,965,966
289 S 4,965,967
295 4,966,609
410 4,965,968

CLASS 52

12 4,965,969
82 4,965,970
199 4,965,971
221 4,965,972
223 R 4,965,973
301 4,965,974
308 4,965,975
396 4,965,976
410 4,965,977
438 4,965,978
585 4,965,979
712 4,965,980

CLASS 53

142 4,965,981
248 4,965,982
435 4,965,983
444 4,965,984
479 4,965,985
551 4,965,986

CLASS 54

7 4,965,987
44 4,965,988

CLASS 55

5 4,966,610
20 4,966,611
162 4,965,989

CLASS 56

13.7 4,965,990
119 4,965,991
241 4,965,992
327.1 4,965,993

CLASS 60

39.142 4,965,995
39.464 4,965,996
39.75 4,965,994
325 4,965,998
547.1 4,965,999
595 4,966,000
737 4,966,001

CLASS 62

24 4,966,612
29 Re.33,408
31 4,966,002
55.5 4,966,016
63 4,966,003
77 4,966,004
79 4,966,005
89 4,966,006
101 4,966,007
137 4,966,008
160 4,966,009
179 4,966,010
4,966,011
180 4,966,012
193 4,966,013
235.1 4,966,014
347 4,966,015

CLASS 65

2 4,966,613
3.12 4,966,614
12 4,966,615
14 4,966,616
21.3 4,966,617
106 4,966,618
348 4,966,619

CLASS 66

310 4,965,997

CLASS 68

5 C 4,966,017

CLASS 70

208 4,966,018
257 4,966,019
276 4,966,020
383 4,966,021

CLASS 71

83 4,966,620
86 4,966,621
92 4,966,622
4,966,623

CLASS 72

41 4,966,022
4,966,023
88 4,966,024
184 4,966,025
224 4,966,026
249 4,966,027
361 4,966,028
379.2 4,966,029

CLASS 73

7 4,966,030
35 4,966,031
64 4,966,032
116 4,967,035
118.2 4,966,033
146.5 4,966,034
146.8 4,966,035
204.22 4,966,036
204.26 4,966,037
606 4,966,038
727 4,966,039
859 Re.33,409
861.22 4,966,040
862.33 4,966,041

CLASS 74

44 4,966,042
52 4,966,043
54 4,967,036
335 4,966,044
424.8 A 4,966,045
502.2 4,966,046
4,966,047
745 4,966,048
866 4,966,049
867 4,966,050

CLASS 75

10.65 4,966,624
234 4,966,625
238 4,966,626
240 4,966,627

CLASS 76

4 4,966,054
80.5 4,966,055

CLASS 81

44 4,966,056
469 4,966,057

CLASS 82

154 4,966,058

CLASS 83

53 4,966,059
105 4,966,060
862 4,966,061

CLASS 84

327 4,966,062
663 4,966,051
715 4,966,052
718 4,966,053

CLASS 89

37.22 4,966,063
46 4,966,064

CLASS 91

361 4,966,065
516 4,966,066

CLASS 92

150 4,966,067
193 4,966,068

CLASS 98

40.11 4,966,069

CLASS 99

302 R 4,966,070
443 C 4,966,072
450.1 4,966,071

CLASS 101

120 4,966,073
177 4,966,074
211 4,966,075
216 4,966,076

CLASS 102

313 4,966,077
384 4,966,078
411 4,966,079

CLASS 104

289 4,966,080

CLASS 105

4.1 4,966,081
422 4,966,082

CLASS 106

30 4,966,628
38.27 4,966,629
426 4,966,630
456 4,966,641

CLASS 108

51.1 4,966,083
51.3 4,966,084
55.1 4,966,085

CLASS 110

215 4,966,086
345 4,966,087

CLASS 112

184 4,966,088
444 4,966,089
456 4,966,090

CLASS 114

345 4,966,091
356 4,966,092

CLASS 118

126 4,966,093
698 4,966,094
723 4,966,095

CLASS 119

3 4,966,096
19 4,966,097
52.2 4,966,098
61 4,966,099

CLASS 122

4 D 4,966,101
6 A 4,966,100

CLASS 123

18 R 4,966,102
65 BA 4,966,104
73 AD 4,966,105
90.31 4,966,106
90.45 4,966,107
90.51 4,966,108
197 AB 4,966,109
198 F Re.33,411
276 4,966,103
327 4,966,110
339 4,966,111
4,966,112
359 4,966,113
396 4,966,114
418 4,966,115
4,966,116
425 4,966,117
492 4,966,118
498 4,966,119
516 4,966,120
536 4,966,121
585 4,966,122
592 4,966,123
598 4,967,037

CLASS 124

23.1 4,966,124

CLASS 126

25 R 4,966,125
4,966,126
362 4,966,127
414 4,966,128
430 4,966,129

CLASS 128

17 4,966,130
24 A 4,966,131
4,966,132
80 C 4,966,133
80 H 4,966,134
82 4,966,135
87 R 4,966,136
4,966,137
155 4,966,138
205.23 4,966,139
206.19 4,966,140
207.14 4,966,141
377 4,966,145
395 4,966,144
419 PG 4,966,146
630 4,966,147
637 4,966,148
644 4,967,038
653 A 4,966,149
660.05 4,966,151
661.04 4,966,150
661.07 4,966,152
661.09 4,966,153
671 4,966,154
4,966,155
672 4,966,156
696 4,966,157
734 4,966,158
743 4,966,159
746 4,966,160
748 4,966,161
750 4,966,162
772 4,966,163
789 4,966,164
830 4,966,165
844 4,966,166
849 4,966,167
853 4,966,168

CLASS 131

31 4,966,169
88 4,966,170
194 4,966,171
276 4,966,172

CLASS 132

54 4,966,173
73 4,966,174
112 4,966,175
325 4,966,176

CLASS 134

61 4,966,177

CLASS 135

19.5 4,966,179
25 R 4,966,180
87 4,966,181
104 4,966,178

CLASS 136

244 4,966,631

CLASS 137

1 4,966,182
116.5 4,966,183
205.5 4,966,184
223 4,966,185
454.5 4,966,186
4,966,187
489 4,966,188
587 4,966,189
613 4,966,190
625.17 4,966,191
625.23 4,966,192
625.35 4,966,193
625.43 4,966,194
625.61 4,966,195
625.64 4,966,196
843 4,966,199
846 4,966,197
862 4,966,198

CLASS 138

31 4,966,200
126 Re.33,412
141 4,966,201
172 4,966,202

CLASS 139

91 4,966,203

CLASS 141

7 4,966,204
9 4,966,205
83 4,966,206
98 4,966,207

CLASS 144

28.72 4,966,208
134 A 4,966,209

CLASS 148

16 4,966,632
101 4,966,633
251 4,966,634
275 4,966,635
329 4,966,636

CLASS 150

138 4,966,210

CLASS 152

225 R 4,966,211
302 4,966,212
504 4,966,213
528 4,966,214
538 4,966,215
556 4,966,216

CLASS 156

47 4,966,637
51 4,966,638
164 4,966,642
215 4,966,643
247 4,966,644
359 4,966,639
394.1 4,966,640
616.4 4,966,645
633 4,966,646
640 4,966,647
643 4,966,648
647 4,966,649

CLASS 160

35 4,966,217
38 4,966,218
201 4,966,219

CLASS 162

14 4,966,650
28 4,966,651
135 4,966,652
273 4,966,653

CLASS 164

34 4,966,220
120 4,966,221
136 4,966,222
305 4,966,223
429 4,966,224
519 4,966,225

CLASS 165

4 4,966,228
41 4,966,229
104.26 4,966,226
150 4,966,230
166 4,966,231
167 4,966,227
169 4,966,232

CLASS 166

250 4,966,233
4,966,234
267 4,966,235
291 4,966,236
292 4,966,237

CLASS 172

19 4,966,238
20 4,966,239
825 4,966,240

CLASS 174

25 C 4,967,039
36 4,967,040
48 4,967,041
250 4,967,042

CLASS 177

253 4,966,241

CLASS 180

9.44 4,966,242
24.09 4,966,244
53.1 4,966,243
68.6 4,966,245
140 4,966,246
171 4,966,247
197 4,966,248
233 4,966,249
4,966,250
33* 4,966,251

CLASS 181

158 4,966,252
227 4,966,253

CLASS 185

30 4,966,254

CLASS 188

71.8 4,966,255
72.7 4,966,256
322.17 4,966,257

CLASS 190

4 4,966,258
18 A 4,966,259
111 4,966,260

CLASS 192

3.29 4,966,261
3.3 4,966,263
3.34 4,966,264
4 A 4,966,262
35 4,966,265
39 4,966,266
48.91 4,966,267
58 C 4,966,268
70.16 4,966,269
87.15 4,966,270

CLASS 198

409 4,966,271
446 4,966,272
601 4,966,273
621 4,966,274
750 4,966,275

CLASS 200

1 B 4,967,043
4 4,967,044
83 J 4,967,047
296 4,967,045
334 4,967,048
339 4,967,046

CLASS 202

177 4,966,654
234 4,966,655

CLASS 203

13 4,966,276
62 4,966,658
76 4,966,657
060.000 4,966,656

CLASS 204

28 4,966,659
34 4,966,660
64 R 4,966,661
71 4,966,662
129.3 4,966,663
146 4,966,664
153.14 4,966,671
157.3 4,966,665
164 4,966,666
182.1 4,966,667
192.12 4,966,669
192.31 4,966,668
198 4,956,672
224 M 4,966,673
290 R 4,966,674
4,966,675
298.12 4,966,676
298.210 4,966,677
406 4,966,670
418 4,966,678

CLASS 206

44 K 4,966,277
315.11 4,966,279
328 4,966,280
330 4,966,281
4,966,282
Re.33,413
387 4,966,283
444 4,966,278
4,966,284
455 4,966,285
610 4,966,286

CLASS 208

58 4,966,679
71 4,966,680
74 4,966,681
139 4,966,682
251 H 4,966,683
4,966,684
390 4,966,685

CLASS 209

164 4,966,687
167 4,966,688
255 4,966,686
384 4,966,689

CLASS 210

86 4,966,690
87 4,966,691
123 4,966,692
195.2 4,966,693
198.2 4,966,694
4,966,695
4,966,696
232 4,966,697
269 4,966,698
321.8 4,966,699
386 4,966,700
419 4,966,701
448 4,966,702
512.1 4,966,703
603 4,966,704
605 4,966,705
609 4,966,706
632 4,966,707
637 4,966,708
651 4,966,709
665 4,966,710
697 4,966,711
705 4,966,712
4,966,713
708 4,966,714
721 4,966,715
755 4,966,716
760 4,966,717
776 4,966,718

CLASS 211

13 4,966,287
60.1 4,966,288
69.5 4,966,289

CLASS 212

258 4,966,290

CLASS 213

71 4,966,291

CLASS 215

256 4,966,292

CLASS 219

10.55 B 4,967,049
4,967,051
10.55 F 4,967,050
10.55 R 4,967,052
69.13 4,967,054
121.5 4,967,055
121.78 4,967,053
203 4,967,056
213 4,967,057
221 4,967,058
230 4,967,059
438 4,967,061
521 4,967,062

CLASS 220

1.5 4,966,293
22.3 4,966,295
23.4 4,966,296
4,966,298
23.83 4,966,297
85 VR 4,966,299
90.2 4,966,300
266 4,966,294
270 4,966,301
306 4,966,302
411 4,966,303

CLASS 221

6 4,966,304
229 4,966,305

CLASS 222

1 4,966,306
3 4,966,307
5 4,966,317
43 4,966,308
105 4,966,310
4,966,311
209 4,966,312
402.19 4,966,313
598 4,966,314
600 4,966,315

CLASS 223

119 4,966,316

CLASS 224

42.46 R 4,966,318
207 4,966,319
229.000 4,966,320
253 4,966,321
267 4,966,322

CLASS 227

51 4,966,323

CLASS 228

263.12 4,966,142

CLASS 229

117.13 4,966,324

CLASS 232

57.5 4,966,325

CLASS 239

99 4,966,326
265.29 4,966,327
524 4,966,328
650 4,966,329
690 4,966,330

CLASS 241

172 4,966,331
199.7 4,966,332

CLASS 242

7.09 4,966,337
75.51 4,966,333
85 4,966,334
255 4,966,335
295 4,966,336

CLASS 244

54 4,966,338

CLASS 248

37.3 4,966,339
125 4,966,340
165 4,966,341
172 4,966,342
243 4,966,343
317 4,966,344
354.3 4,966,345
503 4,966,346
643 4,966,347

CLASS 250

201.1 4,967,063
203.2 4,967,064
203.6 4,967,065
205 4,967,066
208.1 4,967,067
213 A 4,967,068
221 4,967,069
223 B 4,967,070
227.21 4,967,071
231.16 4,967,072
235 4,967,073
236 4,967,074
4,967,076
237 G 4,967,075
237 R 4,967,077
309 4,967,078
327.2 4,967,079
336.1 4,967,080
338.1 4,967,081
338.3 4,967,082
341 4,967,083
361 R 4,967,084
483.1 4,967,085
4,967,086
4,967,087
491.1 4,967,088
493.1 4,967,089
504 R 4,967,090
4,967,091
560 4,967,092
4,967,093
561 4,967,094
572 4,967,095

CLASS 252

8.8 4,966,725
42.7 4,966,719
45 4,966,720
51.5 R 4,966,721
56 R 4,966,722
102 4,966,723
158 4,966,724
174.14 4,966,606
299.6 4,966,726
299.61 4,966,727
354 4,966,728
511 4,966,729
589 4,966,730

CLASS 260

399 4,966,732
400 4,966,731
412.6 4,966,733
420 4,966,734

CLASS 261

40 4,966,735

CLASS 264

11 4,966,736
14 4,966,737
40.5 4,966,738
87 4,966,739
103 4,966,740
154 4,966,741
166 4,966,742
298 4,966,743
328.1 4,966,744

CLASS 266

79 4,966,348
276 4,966,349

CLASS 269

43 4,966,350
328 4,966,351

CLASS 270

1.1 4,966,352
45 4,966,353
56 4,966,354

CLASS 271

3.1 4,966,355
9 4,966,356
4,966,357
10 4,966,358
110 4,966,359
272 4,966,360

CLASS 272

33 R 4,966,361
85 4,966,309
93 4,966,362
4,966,363
111 4,966,364
119 4,966,365

CLASS 273

1 R 4,966,366
26 E 4,966,367
29 A 4,966,368
80 A 4,966,369
176 F 4,966,370
243 4,966,371
252 4,966,372
339 4,966,373

CLASS 277

178 4,966,374

CLASS 279

6 4,966,375

CLASS 280

1 4,966,376
11.2 4,966,377
154 4,966,378
242.1 4,966,379
259 4,966,380
261 4,966,381
288.4 4,966,382
404 4,966,383
688 4,966,384
698 4,966,385
700 4,966,386
712 4,966,387
730 4,966,388
743 4,966,389
772 4,966,390
777 4,966,391
801 4,966,392
4,966,393
807 4,966,394

CLASS 285

12 4,966,395
136 4,966,396
197 4,966,397
319 4,966,398

CLASS 292

359 4,966,399

CLASS 294

1.4 4,966,400

CLASS 296

37.6 4,966,401
43 4,966,402
76 4,966,403
95.1 4,966,404
4,966,405
98 4,966,406
180.1 4,966,407
185 4,966,408
213 4,966,409

CLASS 297

284 4,966,410
301 4,966,411
4,966,412
330 4,966,413
445 4,966,414
4,966,415

CLASS 299

13 4,966,416
33 4,966,417
39 4,966,418

CLASS 301

2.5 4,966,419

CLASS 303

114 4,966,420

CLASS 307

19 4,967,096
22 B1 4,070,586
84 4,967,097
140 4,967,098
264 4,967,099
270 4,967,100
4,967,101
4,967,102
296.5 4,967,103
443 4,967,104
448 4,967,105
455 4,967,106
465 4,967,107
520 4,967,108
571 4,967,109
592 4,967,110

CLASS 310

90 4,967,111
304 4,967,112
313 R 4,967,113
329 4,967,114

CLASS 312

195 4,966,421
218 4,966,422
221 4,966,423
265.6 4,966,424

CLASS 313

103 CM 4,967,115
141 4,967,116
506 4,967,117
609 Re.33,415

CLASS 315

56 4,967,118
111.91 4,967,119
382 4,967,120
411 4,967,121

CLASS 318

254 4,967,122
490 4,967,123
564 4,967,124
568.11 4,967,125
568.19 4,967,126
571 4,967,127
609 4,967,128
621 4,967,129
652 4,967,130
786 4,967,131
798 4,967,132
4,967,133
802 4,967,134
808 4,967,135

CLASS 320

6 4,967,136

CLASS 322

7 4,967,137

CLASS 323

224 4,967,138
312 4,967,139
315 4,967,140
360 4,967,141

CLASS 324

73.1 4,967,142
4,967,143
96 4,967,144
127 4,967,145
158 F 4,967,147
4,967,148
4,967,149
158 R 4,967,146
4,967,150
4,967,152
158 T 4,967,151
174 4,967,153
207.12 4,967,154
212 4,967,155
249 4,967,156
460 4,967,157
536 4,967,158
650 4,967,159

CLASS 328

16 4,967,160
22 4,967,161

CLASS 330

43 4,967,162
86 4,967,163
149 4,967,164

CLASS 331

66 4,967,165
116 R 4,967,166

CLASS 332

144 4,967,167

CLASS 333

26 4,967,168
28 R 4,967,169
106 4,967,170
116 4,967,171
161 4,967,172
260 4,967,173

CLASS 335

5 4,967,174

CLASS 336

65 4,967,175

CLASS 338

22 R 4,967,176

CLASS 340

326 4,967,177
425.5 4,967,178
432 4,967,179
436 4,967,180
450.2 4,967,181
457.3 4,967,182
552 4,967,183
572 4,967,184
4,967,185
575 4,967,186
628 4,967,187
636 4,967,188
679 4,967,189
700 4,967,190
705 4,967,191
811 4,967,192
825.030 4,967,193
825.440 4,967,194
825.520 4,967,195

CLASS 341

67 4,967,196
118 4,967,197
150 4,967,198

CLASS 342

22 4,967,199
25 4,967,200
175 4,967,201

CLASS 343

713 4,967,202

CLASS 346

1.1 4,967,203
4,967,204
76 P H 4,966,464
76 PH 4,967,205
135.1 4,967,206
140 R 4,967,207
4,967,208
4,967,209
150 4,967,210
160 4,967,211
4,967,212

CLASS 350

1.7 4,966,425
3.66 4,966,428
3.7 4,966,426
6.8 4,966,427
96.10 4,966,429
96.11 4,966,430
96.14 4,966,431
96.15 4,966,432
96.17 4,966,433
96.23 4,966,434
96.34 4,966,435
143 4,966,436
166 4,966,437
173 4,966,438
253 4,966,439
320 4,966,440
335 4,966,441
339 R 4,966,442
354 4,966,443

376 4,966,444
377 4,966,445
417 4,966,446
4,966,447
418 4,966,448
454 4,966,449
603 4,966,450

CLASS 351

43 4,966,451
219 4,966,452
242 4,966,453

CLASS 352

59 4,966,454

CLASS 354

79 4,967,214
173.1 4,967,213
4,967,215
4,967,216
173.11 4,967,217
195.1 4,967,218
199 4,967,219
204 4,967,220
318 4,967,221
321 4,967,222
402 4,967,223
4,967,224
4,967,225
406 4,967,226

CLASS 355

32 4,967,227
40 4,967,228
53 4,967,229
91 4,967,230
219 4,967,231
233 4,967,232
4,967,233
260 4,967,234
271 4,967,235
272 4,967,236
290 4,967,237
296 4,967,238
309 4,967,239
318 4,967,240

CLASS 356

73 4,966,455
4,966,456
237 4,966,457
328 4,966,458
358 4,966,459
387 4,966,460
406 4,966,461
437 4,966,462

CLASS 357

19 4,967,241
22 4,967,242
23.4 4,967,243
4,967,244
4,967,245
4,967,246
23.6 4,967,247
4,967,248
24 4,967,249
4,967,250
30 4,967,251
34 4,967,252
4,967,253
4,967,254
37 4,967,255
38 4,967,256
42 4,967,257
51 4,967,258
68 4,967,259
70 4,967,260
4,967,261
80 4,967,262

CLASS 358

11 4,967,263
44 4,967,264
75 4,967,265
76 4,967,266
88 4,967,267
92 4,967,268
95 4,967,270
98 4,967,269
105 4,967,271
135 4,967,272
142 4,967,273
160 4,967,274
183 4,967,275
4,967,276
4,967,277
224 4,967,278
227 4,967,279
4,967,280
229 4,967,281
4,967,282
296 4,967,283
300 4,967,284
304 4,967,285
342 4,967,286
401 4,967,287
425 4,967,288

CLASS 360

46 4,967,289
64 4,967,290
78.04 4,967,291
78.12 4,967,293
78.13 4,967,292
4,967,294
97.02 4,967,295
106 4,967,296
4,967,297
113 4,967,298
121 4,967,299
122 4,967,300
128 4,967,301

CLASS 361

1 4,967,302
23 4,967,303
31 4,967,304
42 4,967,308
160 4,967,309
172 4,967,305
275 4,967,310
323 4,967,306
335 4,967,307
395 4,967,311
399 4,967,312
400 4,967,313
414 4,967,314
424 4,967,315
4,967,316

CLASS 362

31 4,967,317
61 4,967,318
4,967,319
96 4,967,320
101 4,967,321
102 4,967,322
103 4,967,323
147 4,967,324
188 4,967,325
249 4,967,327
267 4,967,328
4,967,329
311 4,967,330
433 4,967,331

CLASS 363

17 4,967,332
4,967,333
34 4,967,334
82 4,967,335
132 4,967,336

CLASS 364

184 4,967,337
200 4,967,338
4,967,339
4,967,340
4,967,341
4,967,342
4,967,343
4,967,344
4,967,345
4,967,346
4,967,347
4,967,348
4,967,349
4,967,350
4,967,351
4,967,352
4,967,353
220 4,967,326
419 4,967,354
424.05 4,967,359
4,967,360
424.07 4,967,362
424.1 4,967,355
4,967,356
426.04 4,967,357
4,967,358
427 4,967,363
474.03 4,967,364
474.15 4,967,365
478 Re.33,416
479 4,967,366
489 4,967,367
513 4,967,368
4,967,369
4,967,370
4,967,371
518 4,967,372
4,967,373
4,967,374
4,967,375
4,967,377
4,967,378
521 4,967,376
526 4,967,379
550 4,967,380
551.01 4,967,381
557 4,967,382
567 4,967,383
4,967,384
571.03 4,967,385
578 4,967,386
580 4,967,387
760 4,967,388
900 4,967,389
4,967,390
4,967,391
4,967,392

CLASS 365

185 4,967,393
201 4,967,394
203 4,967,395
207 4,967,396
222 4,967,397
230.05 4,967,398
230.06 4,967,399

CLASS 366

3 4,966,463
111 4,966,465
132 4,966,466
209 4,966,467
333 4,966,468

CLASS 367

21 4,967,400
46 4,967,401

CLASS 368

280 4,967,402

CLASS 369

44.11 4,967,404
44.26 4,967,403

CLASS 370

1 4,967,405
16 4,967,406
50 4,967,407
62 4,967,408
085.600 4,967,409
105.1 4,967,410
110.1 4,967,411

CLASS 371

20.1 4,967,412
37.4 4,967,413
51.1 4,967,414
4,967,415

CLASS 372

6 4,967,416
29 4,967,417

CLASS 374

208 4,966,469

CLASS 376

249 4,966,746
254 4,966,747
264 4,966,745

CLASS 379

57 Re.33,417

CLASS 383

61 4,966,470

CLASS 384

151 4,966,471
474 4,966,472
477 4,966,473
517 4,966,474
584 4,966,475

CLASS 392

384 4,967,060
386 Re.33,414

CLASS 400

208 4,966,476
522 4,966,477

CLASS 401

57 4,966,478
68 4,966,479
134 4,966,480
205 4,966,481
206 4,966,483
273 4,966,484

CLASS 402

16 4,966,485
68 4,966,486

CLASS 403

24 4,966,482
4,966,487
135 4,966,488

CLASS 404

26 4,966,489
103 4,966,490

CLASS 405

19 4,966,491
128 4,966,492
4,966,493
184 4,966,494
224 4,966,495
227 4,966,496
232 4,966,497
233 4,966,498
271 4,966,499

CLASS 407

34 4,966,500
119 4,966,501

CLASS 408

59 4,966,502
4,966,503

CLASS 409

134 4,966,505
140 4,966,504
4,966,506
175 4,966,507
189 4,966,508
281 4,966,509

CLASS 410

26 4,966,510

CLASS 411

55 4,966,511
181 4,966,512

CLASS 414

277 4,966,513
408 4,966,514
528 4,966,515
537 4,966,516
678 4,966,517
700 4,966,518
786 4,966,519
4,966,520
788.8 4,966,521

CLASS 415

121.2 4,966,522
208.4 4,966,523
223 4,966,524

CLASS 416

9 4,966,525
90 R 4,966,526
241 R 4,966,527

CLASS 417

63 4,966,528
218 4,966,529
273 4,966,530
295 4,966,531
366 4,966,532
413 4,966,533
423.3 4,966,534
553 4,966,535

CLASS 419

8 4,966,748
10 4,966,749

CLASS 420

3 4,966,750
34 4,966,751

CLASS 422

28 4,966,755
37 4,966,756
62 4,966,757
101 4,966,758
186 4,966,759

CLASS 423

53 4,966,760
89 Re.33,410
118 4,966,761
415 P 4,966,762
491 4,966,763
499 4,966,764

CLASS 424

52 4,966,777
88 4,966,753
93 4,966,765
195.1 4,966,754
422 4,966,766
438 4,966,767
461 4,966,770
468 4,966,768
473 4,966,769
478 4,966,771
482 4,966,772
489 4,966,773
601 4,966,774
661 4,966,775
677 4,966,776

CLASS 425

72.1 4,966,536
87 4,966,537
144 4,966,538
208 4,966,539
4,966,540
229 4,966,541
307 4,966,542
522 4,966,543
552 4,966,544
557 4,966,545

CLASS 426

19 4,966,778
72 4,966,779
118 4,966,780
280 4,966,781
551 4,966,782
565 4,966,783

CLASS 427

2 4,966,784
39 4,966,785
64 4,966,797
97 4,966,786
106 4,966,787
210 4,966,788
248.1 4,966,789
358 4,966,792
386 4,966,790
389.9 4,966,791

CLASS 428

7 4,965,793
15 4,966,794
34.3 4,966,795
4,966,796
64 4,966,798
95 4,966,799
97 4,966,800
113 4,966,801
119 4,966,802
192 4,966,803
203 4,966,804
212 4,966,805
220 4,966,806
4,966,807
224 4,966,808
323 4,966,809
335 4,966,810
375 4,966,811
412 4,966,812
421 4,966,813
457 4,966,814
497 4,966,815
552 4,966,816
4,966,817
603 4,966,819
622 4,966,820
694 4,966,821

CLASS 429

62 4,966,822
104 4,966,823

CLASS 430

109 4,966,829
115 4,966,824
137 4,966,825
262 4,966,826
270 4,966,827
281 4,966,828
4,966,830
321 4,966,831
323 4,966,832
378 4,966,833
393 4,966,834
4,966,835
598 4,966,836

CLASS 432

9 4,966,547
77 4,966,548
121 4,966,546
253 4,966,549

CLASS 433

25 4,966,550
95 4,966,551
132 4,966,552
181 4,966,553

CLASS 435

6 4,966,837
7 4,966,838
4,966,839
69.1 4,966,840
4,966,841
4,966,842
69.51 4,966,843
71.2 4,966,844
105 4,966,845
172.3 4,966,846
4,966,847
193 4,966,848
199 4,966,849
200 4,966,850
206 4,966,851
235 4,966,852
284 4,966,853

CLASS 436

57 4,966,854
66 4,966,855
170 4,966,856

CLASS 437

27 4,966,858
29 4,966,859
31 4,966,860
99 4,966,861
100 4,966,862
129 4,966,863
191 4,966,864
192 4,966,865
193 4,966,866
4,966,868
195 4,966,867
200 4,966,869
209 4,966,857
228 4,966,870

CLASS 439

15 4,966,554
28 4,966,555
80 4,966,556
246 4,966,557
566 4,966,559
573 4,966,558
585 4,966,560
622 4,966,561
718 4,966,562
729 4,966,563
840 4,966,564
874 4,966,565

CLASS 440

6 4,966,566
89 4,966,567

CLASS 446

4,966,568
221 4,966,569
440

CLASS 453

6 4,966,570

CLASS 474

111 4,966,571
199 4,966,572

CLASS 475

164 4,966,573
206 4,966,574
257 4,966,575

CLASS 482

558 4,966,818

CLASS 494

56 4,966,576

CLASS 501

150 4,966,871
152 4,966,875

CLASS 502

7 4,966,872
84 4,966,873
117 4,966,874
171 4,966,876
209 4,966,877
226 4,966,878
4,966,879
242 4,966,880
252 4,966,881
309 4,966,882

CLASS 503

208 4,966,883

CLASS 505

1 4,966,884
4,966,885
4,966,886
4,966,887

CLASS 514

2 4,966,888
11 4,966,889
25 4,966,890
49 4,966,891
54 4,966,892
4,966,893
56 4,966,894
81 4,966,895
177 4,966,897
182 4,966,898
197 4,966,899
206 4,966,900
211 4,966,901
262 B1 4,355,032
277 4,966,902
283 4,966,903
301 4,966,904
309 4,966,906
314 4,966,905
337 4,966,907
340 4,966,908
359 4,966,909
383 4,966,910
385 4,966,911

CLASSIFICATION OF PATENTS

397 4,966,912
415 4,966,913
461 4,966,914
469 4,966,896
531 4,966,915
534 4,966,916
616 4,966,917
656 4,966,918

CLASS 521

54 4,966,919
99 4,966,920
131 4,966,921

CLASS 522

25 4,966,922
167 4,966,923

CLASS 523

106 4,966,924
177 4,966,925
210 4,966,926
401 4,966,927
437 4,966,928

CLASS 524

71 4,966,929
83 4,966,930
100 4,966,931
245 4,966,932
310 4,966,933
315 4,966,934
412 4,966,935
425 4,966,936
458 B1 4,647,612
B1 4,692,491
538 4,966,937
555 4,966,938
811 4,966,939

CLASS 525

66 4,966,940
4,966,941
67 4,966,942
68 4,966,943
88 4,966,944
113 4,966,945
314 4,966,946
327.6 4,966,947
329.9 4,966,948
420 4,966,949
444 4,966,950

CLASS 526

106 4,966,951
340.2 4,966,952

CLASS 528

60 4,966,953
125 4,966,954
183 4,966,955
185 4,966,956
193 4,966,957
271 4,966,958
272 4,966,959
335 4,966,960
345 4,966,961

CLASS 530

317 4,966,962
351 4,966,963

CLASS 536

27 4,966,964
4,966,965
119 4,966,966

CLASS 540

568 4,966,967

CLASS 544

176 4,966,968
352 4,966,969
410 4,966,970

CLASS 546

64 4,966,971
260 4,966,972
269 4,966,973
294 4,966,974

CLASS 548

122 4,966,975
267.8 4,966,976
457 4,966,977
469 4,966,978
950 4,966,979
954 4,966,980

CLASS 549

215 4,966,981
274 4,966,982
389 4,966,983

CLASS 552

208 4,966,984

CLASS 556

116 4,966,985
473 4,966,986

CLASS 558

115 4,966,987
342 4,966,988

CLASS 560

183 4,966,989
214 4,966,990

CLASS 562

24 4,966,991
424 4,966,992
540 4,966,993
554 4,966,994
598 4,966,996
623 4,966,997
861 4,966,995
869 4,966,998

CLASS 564

150 4,966,999
242 4,967,000
305 4,967,001
307 4,967,002
381 4,967,003
397 4,967,004
424.05 4,967,361
475 4,967,005
490 4,967,006
501 4,967,007
512 4,967,008

CLASS 568

309 4,967,009
315 4,967,010
325 4,967,011
415 4,967,012
433 4,967,013
458 4,967,014
616 4,967,015
618 4,967,016
621 4,967,017
867 4,967,018
873 4,967,019
896 4,967,020

CLASS 570

101 4,967,021
136 4,967,022
166 4,967,023
168 4,967,024
177 4,967,025
194 4,967,026

CLASS 585

5 4,967,027
6.3 4,967,028
12 4,967,029
241 4,967,030
250 4,967,031
255 4,967,032
358 4,967,033
446 4,967,034

CLASS 604

20 4,966,577
26 4,966,578
65 4,966,579
67 4,966,580
72 4,966,581
86 4,966,582
98 4,966,583
119 4,966,584
131 4,966,585
164 4,966,586
4,966,587
165 4,966,588
174 4,966,589
180 4,966,590
192 4,966,591
198 4,966,592
4,966,593
349 4,966,594
393 4,966,595

CLASS 606

7 4,966,596
50 4,966,597
69 4,966,599
74 4,966,600
92 4,966,601
103 4,966,143
154 4,966,602
158 4,966,603
159 4,966,604
214 4,966,605

CLASSIFICATION OF DESIGNS

D1— 126 311,625
311,626
311,627
311,628
311,629
311,630
311,631
D2— 10 311,632
252 311,633
314 311,634
311,635
311,636
311,637
605 311,638
D3— 5 311,639
30.1 311,644
38 311,640
311,641
62 311,642
311,643
D4— 115 311,645
D5— 24 311,646
D6— 370 311,647
397 311,648
445 311,649
446 311,650
462 311,651
471 311,652
536 311,656
542 311,653
545 311,654
573 311,655
574 311,657
D7— 378 311,658
384 311,659
397 311,660
311,661
505 311,662
545 311,663
591 311,664
601 311,665
D8— 1 311,666
18 311,667
40 311,668
50 311,669
52 311,671
71 311,672
98 311,673
311,674
311,675
211 311,670
303 311,676
323 311,677
353 311,678
373 311,679
382 311,680
D9— 387 311,681
404 311,682
415 311,683
418 311,684
423 311,685
311,686
425 311,687
435 311,688
D10— 15 311,690
311,691
22 311,692
39 311,693
311,694
46 311,695
46.1 311,707
60 311,689
311,696
72 311,697
75 311,698
78 311,699
311,700
98 311,701
106 311,702
113 311,704
121 311,705
128 311,706
D11— 95 311,708
D12— 91 311,709
92 311,710
96 311,711
311,712
133 311,713
155 311,714
182 311,715
191 311,716
211 311,717
213 311,718
308 311,721
328 311,719
331 311,720
D13— 102 311,722
133 311,733
146 311,724
147 311,725
162 311,723
168 311,726
174 311,727
D14— 100 311,728
311,729
102 311,730
106 311,741
107 311,740
113 311,738
114 311,737
311,739
121 311,735
311,736
126 311,734
135 311,731
311,732
D15— 15 311,742
28 311,743
311,744
66 311,745
69 311,746
140 311,747
D16— 133 311,748
218 311,749
D17— 14 311,750
D18— 13 311,752
23 311,753
311,754
42 311,755
D19— 32 311,756
34 311,751
53 311,757
D21— 25 311,758
65 311,759
78 311,760
111 311,761
166 311,762
220 311,763
D22— 141 311,764
311,765
D23— 207 311,766
311,767
209 311,768
277 311,770
292 311,769
313 311,771
378 311,772
411 311,773
D24— 34 311,774
D25— 33 311,775
D26— 42 311,776
311,777
45 311,778
46 311,779
311,780
65 311,781
D28— 9 311,782
18 311,783
48 311,784
61 311,785
77 311,787
91.1 311,786
D29— 6 311,788
9 311,789
10 311,791
14 311,792
20 311,790
D30— 148 311,793
158 311,794
161 311,795
D32— 31 311,796
32 311,797
D34— 5 311,801
21 311,802
28 311,804
32 311,798
38 311,803
40 311,799
311,800

CLASSIFICATION OF PLANTS

P.— 26 7,368
54 7,369
7,370
68 7,371
7,372
7,373
7,374

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,967,047
4,967,286
02 : 4,956,233
4,966,947
04 : 4,966,174
4,966,190
4,966,451
4,966,523
4,966,563
4,966,858
4,966,869
4,967,211
4,967,270
4,967,301
4,967,335
05 : 4,965,992
4,966,129
06 : Re.33,406
Re.33,407
Re.33,415
4,965,887
4,965,888
4,965,891
4,965,892
4,965,893
4,965,895
4,965,905
4,965,922
4,965,927
4,965,943
4,965,948
4,965,951
4,965,961
4,965,967
4,965,980
4,965,989
4,965,993
4,965,995
4,966,005
4,966,018
4,966,021
4,966,081
4,966,102
4,966,131
4,966,135
4,966,143
4,966,163
4,966,167
4,966,186
4,966,191
4,966,207
4,966,226
4,966,252
4,966,259
4,966,312
4,966,329
4,966,340
4,966,342
4,966,363
4,966,368
4,966,371
4,966,378
4,966,379
4,966,390
4,966,391
4,966,405
4,966,407
4,966,422
4,966,423
4,966,426
4,966,427
4,966,437
4,966,448
4,966,456
4,966,514
4,966,541
4,966,550
4,966,551
4,966,585
4,966,592
4,966,604
4,966,610
4,966,611
4,966,620
4,966,627
4,966,636
4,966,646
4,966,654
4,966,663
4,966,672
4,966,717
4,966,736
4,966,744
4,966,746
4,966,763
4,966,765
4,966,767
4,966,769
4,966,781
4,966,787
4,966,788
4,966,791
4,966,793
4,966,802
4,966,822
4,966,823
4,966,840
4,966,843
4,966,844
4,966,854
4,966,868
4,966,890
4,966,988
4,966,998
4,967,038
4,967,060
4,967,061
4,967,063
4,967,065
4,967,071
4,967,075
4,967,095
4,967,098
4,967,107
4,967,147
4,967,152
4,967,154
4,967,155
4,967,169
4,967,173
4,967,174
4,967,176
4,967,195
4,967,203
4,967,207
4,967,208
4,967,245
4,967,249
4,967,250
4,967,268
4,967,271
4,967,277
4,967,290
4,967,296
4,967,300
4,967,305
4,967,311
4,967,328
4,967,329
4,967,342
4,967,346
4,967,347
4,967,351
4,967,381
4,967,389
4,967,392
4,967,408
4,070,586
4,355,032
08 : 4,966,088
4,966,296
4,966,310
4,966,351
4,966,382
4,966,499
4,967,057
4,967,157
4,967,159
4,967,162
4,967,258
4,967,291
4,967,401
4,967,412
09 : 4,966,059
4,966,171
4,966,224
4,966,234
4,966,255
4,966,272
4,966,398
4,966,479
4,966,556
4,966,647
4,966,652
4,966,780
4,966,912
4,966,938
4,967,083
4,967,304
4,967,405
10 : 4,966,730
4,966,926
4,966,934
4,966,939
4,966,941
4,966,949
4,967,022
4,967,024
4,966,096
11 : Re.33,412
12 : 4,965,902
4,965,906
4,965,944
4,965,949
4,965,955
4,965,960
4,966,072
4,966,139
4,966,154
4,966,168
4,966,229
4,966,287
4,966,297
4,966,300
4,966,316
4,966,322
4,966,381
4,966,402
4,966,491
4,966,590
4,966,594
4,966,605
4,966,770
4,966,800
4,967,001
4,967,112
13 : 4,967,165
4,967,321
4,967,330
4,967,375
13 : 4,965,976
4,966,130
4,966,209
4,966,253
4,966,306
4,966,599
4,966,615
15 : 4,966,053
16 : 4,966,217
4,967,262
17 : Re.33,413
4,965,933
4,966,047
4,966,065
4,966,125
4,966,132
4,966,176
4,966,197
4,965,199
4,966,290
4,966,298
4,966,348
4,966,460
4,966,462
4,966,472
4,966,481
4,966,538
4,966,555
4,966,582
4,966,600
4,966,711
4,966,720
4,966,845
4,966,913
4,966,914
18 : 4,965,900
4,965,936
4,966,108
4,966,189
4,966,193
4,966,204
4,966,267
4,966,509
4,966,609
4,966,623
4,966,692
4,966,716
4,966,932
4,966,946
4,966,972
4,966,986
4,967,044
4,967,121
19 : 4,965,910
4,965,953
4,966,004
4,966,200
4,966,239
20 : 4,965,991
4,966,074
4,966,218
4,966,311
4,966,503
4,967,055
4,967,210
21 : 4,966,169
4,966,948
22 : 4,966,127
4,966,184
4,966,387
4,966,495
4,966,566
4,966,682
4,966,874

4,966,878
4,966,879
4,966,880
4,966,881
4,966,937
4,967,005
4,967,048
24 : 4,966,007
4,966,014
4,966,162
4,966,846
4,966,925
4,967,201
4,967,272
4,967,372
25 : 4,965,921
4,966,016
4,966,133
4,966,137
4,966,142
4,966,278
4,966,396
4,966,521
4,966,596
4,966,597
4,966,631
4,966,667
4,966,742
4,966,806
4,966,807
4,966,848
4,966,849
4,966,871
4,966,962
4,966,964
4,967,078
4,967,089
4,967,090
4,967,115
4,967,278
4,967,314
4,967,322
4,967,323
4,967,344
4,967,369
26 : 4,965,914
4,965,957
4,965,987
4,966,048
4,966,061
4,966,067
4,966,182
4,966,183
4,966,195
4,966,210
4,966,225
4,966,246
4,966,262
4,966,280
4,966,294
4,966,299
4,966,343
4,966,394
4,966,395
4,966,559
4,966,574
4,966,633
4,966,638
4,966,685
4,966,689
4,966,697
4,966,708
4,966,718
4,966,779
4,966,875
4,967,084

27 : Re.33,414
4,966,037
4,966,044
4,966,055
4,966,138
4,966,141
4,966,166
4,966,237
4,966,238
4,966,283
4,966,284
4,966,288
4,966,404
4,966,465
4,966,534
4,966,603
4,966,639
4,966,707
4,966,754
4,966,782
4,966,852
4,967,182
30 : 4,966,656
4,966,658
31 : 4,965,938
4,966,258
4,966,696
32 : 4,965,913
4,966,400
4,966,816
33 : 4,966,410
4,966,543
4,966,560
4,966,691
4,967,368
34 : 4,966,002
4,966,087
4,966,318
4,966,337
4,966,357
4,966,431
4,966,433
4,966,446
4,966,447
4,966,471
4,966,586
4,966,589
4,966,645
4,966,681
4,966,683
4,966,684
4,966,715
4,966,719
4,966,721
4,966,722
4,966,750
4,966,762
4,966,777
4,966,783
4,966,885
4,966,888

4,967,398
Re.33,414
4,966,044
4,966,055
4,966,138
4,966,141
4,966,166
4,966,237
4,966,238
4,966,283
4,966,284
4,966,288
4,966,404
4,966,465
4,966,534
4,966,603
4,966,639
4,966,707
4,966,754
4,967,064
4,967,185
4,967,298
4,967,306
Re.33,417
4,965,942
4,965,990
29 : 4,965,925
4,966,279
4,966,321
4,966,498
4,966,731
4,966,741
4,966,758
4,966,782
4,966,852
4,967,182
4,966,656
4,966,658
4,965,938
4,966,258
4,966,696
4,965,913
4,966,400
4,966,816
4,966,410
4,966,543
4,966,560
4,966,691
4,967,368
4,966,002
4,966,087
4,966,318
4,966,337
4,966,357
4,966,431
4,966,433
4,966,446
4,966,447
4,966,471
4,966,586
4,966,589
4,966,645
4,966,681
4,966,683
4,966,684
4,966,715
4,966,719
4,966,721
4,966,722
4,966,750
4,966,762
4,966,777
4,966,783
4,966,885
4,966,888

4,966,895
4,966,906
4,966,907
4,966,975
4,966,999
4,967,020
4,967,029
4,967,030
4,967,032
4,967,068
4,967,167
4,967,168
4,967,177
4,967,196
4,967,263
4,967,308
4,967,315
4,967,345
4,967,388
4,967,397
35 : 4,966,812
4,966,919
4,967,000
4,967,123
36 : 4,965,890
4,965,896
4,965,897
4,965,963
4,965,964
4,966,001
4,966,010
4,966,013
4,966,034
4,966,042
4,966,097
4,966,178
4,966,179
4,966,181
4,966,201
4,966,277
4,966,317
4,966,320
4,966,323
4,966,324
4,966,325
4,966,365
4,966,414
4,966,415
4,966,458
4,966,461
4,966,464
4,966,469
4,966,477
4,966,487
4,966,526
4,966,546
4,966,554
4,966,561
4,966,625
4,966,673
4,966,695
4,966,735
4,966,768
4,966,778
4,966,785
4,966,815
4,966,831
4,966,872
4,966,887
4,966,916
4,966,918
4,966,922
4,966,954
4,967,031

4,967,062
4,967,085
4,967,087
4,967,094
4,967,109
4,967,151
4,967,183
4,967,184
4,967,188
4,967,233
4,967,236
4,967,238
4,967,243
4,967,253
4,967,264
4,967,265
4,967,273
4,967,332
4,967,343
4,967,353
4,967,370
4,967,404
4,967,414
37 : 4,965,917
4,966,000
4,966,062
4,966,202
4,966,452
4,966,510
4,966,640
4,966,655
4,966,713
4,966,728
4,966,740
4,966,862
4,967,267
4,967,366
38 : 4,967,385
39 : 4,965,909
4,965,969
4,965,972
4,965,994
4,966,103
4,966,124
4,966,228
4,966,256
4,966,286
4,966,338
4,966,489
4,966,504
4,966,506
4,966,562
4,966,693
4,966,709
4,966,897
4,966,898
4,966,909
4,966,952
4,967,008
4,967,037
4,967,070
4,967,077
4,967,136
4,967,230
4,967,303
40 : 4,966,165
4,966,212
4,966,235
4,966,303
4,966,688
4,966,951
41 : 4,965,945
4,965,984
4,966,092
4,966,160
4,966,275

4,966,362
4,966,441
4,967,175
4,967,198
42 : Re.33,409
4,965,930
4,965,932
4,965,940
4,965,988
4,966,056
4,966,177
4,966,291
4,966,292
4,966,304
4,966,350
4,966,372
4,966,419
4,966,455
4,966,474
4,966,516
4,966,552
4,966,557
4,966,593
4,966,613
4,966,651
4,966,680
4,966,687
4,966,710
4,966,747
4,966,753
4,966,760
4,966,771
4,966,817
4,966,827
4,966,870
4,966,905
4,966,967
4,967,006
4,967,045
4,967,052
4,967,126
4,647,612
4,692,491
43 : 4,966,366
44 : 4,965,979
4,966,058
45 : 4,965,920
4,966,079
4,966,745
4,967,187
47 : 4,965,952
4,966,370
4,966,517
4,966,570
4,966,764
4,966,847
4,966,917
4,966,959
4,967,042
4,967,320
48 : 4,965,937
4,965,954
4,965,956
4,965,974
4,965,977
4,966,063
4,966,098
4,966,099
4,966,134
4,966,148
4,966,156
4,966,236
4,966,295
4,966,344
4,966,367
4,966,369

4,966,397
4,966,413
4,966,496
4,966,497
4,966,507
4,966,519
4,966,577
4,966,584
4,966,619
4,966,644
4,966,690
4,966,698
4,966,773
4,966,775
4,966,776
4,966,810
4,966,837
4,966,864
4,966,865
4,966,892
4,967,016
4,967,076
4,967,102
4,967,108
4,967,146
4,967,166
4,967,317
4,967,327
4,967,337
4,967,340
4,967,382
4,967,384
4,967,400
4,967,407
49 : 4,966,161
4,966,173
4,966,388
4,966,490
4,966,666
4,966,757
4,966,927
4,967,130
51 : 4,966,017
4,966,159
4,966,170
4,966,436
4,966,583
4,966,979
4,967,153
4,967,354
4,967,416
53 : 4,965,941
4,965,958
4,965,982
4,966,401
4,966,841
4,966,883
4,966,911
4,967,378
54 : 4,966,950
4,967,018
4,967,041
55 : 4,966,220
4,966,230
4,966,260
4,966,309
4,966,347
4,966,470
4,966,488
4,966,567
4,966,795
4,966,884
4,966,965
4,967,134
4,967,362

DESIGN PATENTS

04 : 311,752
05 : 311,773
06 : 311,634
311,635
311,636
311,638
311,676
311,679
311,683
311,711
311,712
311,713
311,714
311,721
311,724
311,737
311,743
311,750
311,753

08 : 311,652
09 : 311,695
311,754
311,756
311,767
311,771
311,775
311,796
311,801
311,761
311,766
311,793
12 : 311,672
311,673
311,726
311,751
311,774
13 : 311,657
17 : 311,648

311,651
311,662
311,664
311,688
311,690
311,691
311,703
311,705
311,780
18 : 311,760
20 : 311,742
311,777
23 : 311,762
24 : 311,763
25 : 311,738
311,782
26 : 311,667
311,702
311,744

311,785
27 : 311,640
29 : 311,797
33 : 311,803
34 : 311,653
311,687
311,736
311,768
311,781
311,783
36 : 311,647
311,675
311,681
311,716
311,723
311,787
311,788
311,802

37 : 311,632
311,644
311,649
311,650
311,708
39 : 311,654
311,668
311,693
311,694
311,746
311,799
40 : 311,677
311,764
311,765
311,795
41 : 311,637
42 : 311,656
311,678

311,794
44 : 311,642
311,643
311,666
47 : 311,698
48 : 311,718
311,719
311,720
311,757
51 : 311,639
53 : 311,641
311,700
311,798
55 : 311,704
311,707
311,770
311,789

PLANT PATENTS

12 : 7,369
7,370

U.S. GOVERNMENT PRINTING OFFICE : O—1990

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

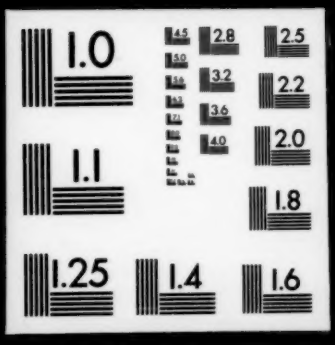
(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*


1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8